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HELMINTHOLOGICAL ABSTRACTS

incorporating

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Helminthological Abstracts
incorporating
Bibliography of Helminthology

Abstracts in the present number are by:

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HELMINTHOLOGICAL ABSTRACTS

INCORPORATING BIBLIOGRAPHY OF HELMINTHOLOGY

FOR THE YEAR 1955

Vol. 24, Part 4

320—Acta Medica Orientalia.

a. REITLER, R. & YOFFE, J., 1955.—" Filariasis in the Jewish communities of Malabar." **14** (4), 83–95.

(320a) Reitler & Yoffe have studied the possibility of the spread of filarial infection into Israel following the settlement of five Jewish communities from Malabar, India. In these communities filarial disease was found in 181 out of 909, 54 out of 262, seven out of 98 [96 is given in the table], eight out of 235 and eight out of 400. Although bancroftian filariasis is by far the commonest in Malabar and *Culex fatigans* is found in Israel, the authors conclude that filariasis is unlikely to spread. Conditions in Israel are shown to be relatively unfavourable. One hundred and seven Indian immigrants and 101 Europeans were examined in Israel more than two years after they had settled together in two villages. Only 12 of the Indians showed microfilariae and the infection had not spread to the Europeans. Diethylcarbamazine treatment is, however, advisable and has been given to Malabar immigrants after their arrival. This should be repeated at half-yearly intervals for two years. M.McK.

321—Acta Neurologica et Psychiatrica Belgica.

*a. JANSSEN, P., 1955.—" Sur un cas de cysticercose cérébrale chez le noir." **55** (2), 86–93.

322—Acta Parasitologica Polonica.

a. ŚLUSARSKI, W., 1955.—" Studia nad europejskimi przedstawicielami przywry *Fasciola magna* (Bassi, 1875) Stiles, 1894. I. Ponowne wykrycie ogniska inwazji u jeleni na Śląsku." **3** (1/5), 1–59. [English & Russian summaries pp. 43–59.]

b. IWAŃCZUK, I. & STOBNICKA, I., 1955.—" Badania nad zarażeniem pasożytami jelitowymi dzieci w przedszkolach i szkołach podstawowych m. Warszawy." **3** (1/5), 77–98. [English & Russian summaries pp. 95–98.]

c. DARSKI, J., 1955.—" Wpływ fenotiazyny na rozwój jaj i larw nicieni pasożytniczych w kale zwierząt użytkowych." **3** (1/5), 99–111. [English & Russian summaries pp. 108–111.]

(322a) Slusarski, describing *Fasciola magna* from a *Cervus elaphus* in lower Silesia, briefly reviews the literature on its previous occurrences in Europe and maintains that *F. magna* was probably introduced with *C. elaphus canadensis* from North America about the middle of the last century. He does not consider Ward's *Fascioloides* justifiable and adopts the earlier combination *Fasciola magna* (Bassi, 1875) Stiles, 1894. G.I.P.

(322b) Iwańczuk & Stobnicka have completed their examination of children in Warsaw for intestinal parasites [for abstract of earlier paper see Helm. Abs., **22**, No. 445d] and now report with statistical detail on the incidence of helminths and *Giardia* in the primary and infant schools. They note that the highest percentage of infection with *Enterobius vermicularis* was found in areas situated along the Vistula. G.I.P.

* Titles so marked throughout this number have not been seen in the original.

(322c) The use of phenothiazine to inhibit development of nematode eggs and larvae in faeces sent for diagnosis was tested *in vitro* on ova of gastro-intestinal Strongyloidea in horse, pig and sheep faeces, on lungworm larvae from sheep and on free *Ascaridia galli* eggs obtained from the uterus of female worms. The development was delayed in 90% to 91% of the eggs in horse and pig faeces by one part of phenothiazine in 100 and 1,000 parts faeces and in 90% of the *A. galli* eggs by a 1:100 suspension. The consistency of the sheep faeces prevented the eggs from coming into direct contact with the phenothiazine. This factor also influenced the tests intended to determine the effect of phenothiazine on larvae of *Dictyocaulus filaria* and *Protostrongylus rufescens* in sheep faeces, for 62% to 66% of the larvae remained viable even at 1:100 concentrations. G.I.P.

323—Acta Scholae Medicinalis Universitatis in Kioto.

a. HORI, T., 1955.—" A microfilaria-like parasite in vesicles." **32** (2), 138–141.

(323a) A single nematode embryo without sheath, with a blunt tail and measuring 150 μ in length, was found in the contents of one of the vesicles on the upper and lower limbs of a servant maid suffering from pruriginous erythemata. R.T.L.

324—Acta Zoologica Sinica. Peking.

a. CHIANG, C. P., 1955.—[Preliminary observations on granular changes of yolk masses during development of eggs of *Diplodiscus*.] **7** (1), 17–30. [In Chinese: English summary p. 27.]
b. YEH, Y. & WU, S. C., 1955.—[Note on a new trematode *Genarchopsis shanghaiensis* n.sp. (Trematoda: Hemiuridae) and its progenesis in freshwater shrimps around Shanghai region.] **7** (1), 37–42. [In Chinese: English summary p. 42.]
c. YEH, L. S., 1955.—[On a new tapeworm *Bothriocephalus gowkongensis* n.sp. (Cestoda: Bothriocephalidae) from freshwater fish in China.] **7** (1), 69–74. [In Chinese: English summary p. 73.]

(324a) This paper is based on what Chiang describes as "the great discovery of Lepeshinskaya—the formation of cells from non-cellular 'living matter', such as the yolk globules of the hen's egg". With this in mind, Chiang studied the development of eggs of *Diplodiscus sinensis* and *D. japonicus*. He found that during the course of their development granules appeared in the yolk area. These granules eventually aggregated into spherical masses, each of which was soon provided with a membrane and often with a nucleus. That is to say, the essential components of a cell were then present. When these cells were mechanically pressed out from the eggs and vitally stained with methylene blue, the cytoplasm took little stain but the nucleus became deep blue. On the death of the embryo, all the contents of the egg were transformed into these granular cells, and in one case they were actively dividing. Chiang points out that this work is preliminary in nature and more intensive work is needed in order to find the relationship between the granular cells and the embryo of the trematode in question. He states that the germ-cell cycle of trematodes has puzzled zoologists in the last few decades but should be re-examined in the light of the new direction given by the Russian cytologist Lepeshinskaya. L.S.Y.

(324b) Yeh & Wu describe *Genarchopsis shanghaiensis* n.sp. from the ovary of the freshwater shrimp *Macrobrachium nipponensis* in the Shanghai area. This trematode is an unencysted metacercaria showing profound progenesis in its internal structures especially in the reproductive system which is fully developed: the worm is filled with light brownish eggs. This is the third case of progenesis in forth-stage trematode larvae parasitic in *M. nipponensis* in Shanghai. The chief differential characters of the present species when compared with *Genarchopsis goppo*, *G. anguillae* and *G. chinensis* are the presence of (i) a seminal receptacle, (ii) eggs with single long polar filaments, (iii) an excretory bladder with the union of two branches anterior to the ventral sucker, (iv) short caeca uniting anterior to the ventral sucker and (v) testes on opposite sides laterally. L.S.Y.

(324c) Yeh describes *Bothriocephalus gowkongensis* n.sp. from the fresh-water fish *Ctenopharyngodon idellus* from Gowkong, near Canton. This tapeworm causes a high mortality in the host and heavy losses to the fresh-water fishing industry. A preliminary note is given on the life-cycle which involves a cyclops as the intermediate host. *B. gowkongensis* resembles *B. achilognathi* but is easily distinguished as it has square gravid segments, less developed vitellaria, testes in a single layer in transverse sections, and eggs fully embryonated when laid. *B. opsarrichthydis* is considered a synonym of *B. achilognathi*. L.S.Y.

325—Agricultura. Madrid.

a. BENLLOCH, M., 1955.—" La *Heterodera schachtii* Schmidt, de la remolacha." **24** (275), 127–130.

(325a) *Heterodera schachtii* has caused damage to beets in Spain and Benlloch describes briefly the symptoms of attack, the life-history of the nematode and cultural practices of use in controlling it, including crop rotation and the destruction of weed hosts. M.T.F.

326—Agricultural Gazette of New South Wales.

a. ANON., 1955.—" New plant diseases." **66** (11), 604.

(326a) *Aphelenchoides* sp. is recorded on *Cyclamen giganteum* and *Impatiens sultani*, and *Meloidogyne* sp. on *Indigofera enneaphylla*, *Sesbania* sp., *Trifolium pratense* and *T. subterraneum* for the first time in New South Wales. S.W.

327—American Journal of Hygiene.

a. SADUN, E. H., 1955.—" Studies on *Opisthorchis viverrini* in Thailand." **62** (2), 81–115.
b. SADUN, E. H., 1955.—" Studies on the distribution and epidemiology of hookworm, *Ascaris*, and *Trichuris* in Thailand." **62** (2), 116–155.

(327a) No evidence was obtained that *Opisthorchis viverrini* is endemic in central and south Thailand. But in the north-east region, where between one-and-a-half and two million people are infected, it constitutes one of the most important public health problems, especially in the Mekong Valley. The infection is almost entirely restricted to the Siamese inhabitants who frequently eat raw fish, especially in the form of koi-pla. Cats and dogs were found to be naturally infected not only in north-east Thailand but also in central Thailand where no indigenous cases in man have yet been discovered. Liver cirrhosis and carcinoma of the bile-ducts were often observed. A combination of legislative measures and propaganda is the only likely form of effective control. R.T.L.

(327b) Ascaris, hookworm and Trichuris infections are a major health problem in south Thailand. Only moderate infections occur in the other regions. This difference is attributed to the climatic conditions; only in the south is rainfall abundant throughout most of the year. R.T.L.

328—American Journal of Pathology.

a. LICHTENBERG, F., 1955.—" Lesions of the intrahepatic portal radicles in Manson's schistosomiasis." **31** (4), 757–771.
b. GOULD, S. E., GOMBERG, H. J., BETHELL, F. H., VILLELLA, J. B. & HERTZ, C. S., 1955.—" Studies on *Trichinella spiralis*. I. Concerning the time and site of insemination of females of *Trichinella spiralis*. II. Time of initial recovery of larvae of *Trichinella spiralis* from blood of experimental animals. III. Effect on the intestinal phase of trichinosis of feeding massive numbers of irradiated trichina larvae. IV. Effect of feeding irradiated *Trichinella* larvae on production of immunity to re-infection. V. Tests for a strain of trichina larvae resistant to radiation." **31** (5), 933–963.

(328a) In schistosomiasis mansoni, hitherto undescribed lesions in the intrahepatic portal radicles were observed, viz., (i) substitution by granuloma, (ii) sclerosis and narrowing and (iii) intrahepatic thrombophlebitis. In advanced cases there was sometimes capillary

telangiectasia of the portal fields, intrahepatic arteriolar sclerosis and median hypertrophy. The pathogenesis is similar to that of other vascular lesions in the lungs and other organs. R.T.L.

(328b) Part I. Insemination of *Trichinella spiralis* occurred in the mucosa of the villi in rats; it was first noted 30 hours after feeding "excysted" larvae. Part II. Larvae first appeared in venous or cardiac blood as follows: in the rat and rabbit, 114 hours after feeding; in the dog and monkey, after 120 hours. Part III. A dose of 12,000 larvae, normally fatal to rats, when exposed to 10,000 r. (cobalt-60) caused transient diarrhoea; when exposed to 18,000 r. even a double dose of larvae had little effect on the host. Part IV. Exposure to 10,000 r. caused sexual sterilization of a large proportion of *T. spiralis* larvae but did not prevent them from developing into adults. Such larvae, when given to rats, gave rise to an immunity to non-irradiated larvae. Larvae which had been exposed to 18,000 r. gave little or no immunity. Part V. Progeny produced from *T. spiralis* larvae which had been exposed to 10,000 r. showed no evidence of resistance to radiation. W.P.R.

329—American Journal of Surgery.

*a. DAVIDSON, L. R., 1955.—" Hydatid cysts of the lung." **89** (5), 1042–1053.

330—American Journal of Tropical Medicine and Hygiene.

a. MELENEY, H. E. & FRYE, W. W., 1955.—" Teaching and research in parasitology and tropical medicine in medical schools of the United States: a survey and a fellowship program." **4** (5), 769–775.
b. NORMAN, L. & DONALDSON, A. W., 1955.—" Spores of helicosporous fungi resembling microfilariae in blood films." **4** (5), 889–893.
c. KUNTZ, R. E., LAWLESS, D. K. & MANSOUR, N. S., 1955.—"A cursory survey of the intestinal parasites of natives living in southwest Sudan." **4** (5), 895–900.

(330a) Of the 81 medical schools in the U.S.A., 19 gave more than 60 hours' instruction in parasitology in 1954; 44 schools gave 30–60 hours. The average time devoted to such instruction has dropped to 47 hours from 53 in 1945. Sixty hours is considered the minimum for adequate instruction. Tropical medicine is hardly taught now as a separate subject. The instructors numbered 193, i.e. about as many as in 1945. The National Institute of Health has approved a fellowship programme enabling instructors to study tropical diseases in Central America. It will be administered by Louisiana State University and financed for two years by the China Medical Board of New York. M.McK.

(330b) Structures which resembled human microfilariae were found singly on blood films and other clinical material. These are apparently the coiled conidia of helicosporous fungi. It is believed that the "filariae" reported by Bockhorn in 1915 from Russian prisoners and the *Sergentella spiroides* described as a new species by Jirovec *et al.* in 1953, are in fact such spores. G.I.P.

(330c) The incidence of helminth infections in a series of faecal samples from 79 natives, mostly Dinkas, living in the south-western part of the Sudan was: hookworm 23% [given as 3% in the summary], *Trichostrongylus* 2%, *Enterobius vermicularis*, *Trichuris trichiura* and *Hymenolepis nana* each 1%. No case of *Ascaris* was detected although the local conditions for its propagation appeared favourable. *Schistosoma mansoni* eggs were present in 10%. Verbal evidence indicated the occurrence of vesical schistosomiasis and of *Dracunculus medinensis*. A table gives the percentage incidence of intestinal parasites reported by the medical services of the Sudan Government Ministry of Health for five hospitals in the provinces of Kosti Blue, Malakal, Juba Equatoria, Yei Equatoria and Rumbek-Bahr El Ghazal. R.T.L.

330—American Journal of Tropical Medicine and Hygiene. (cont.)

d. KELLEY, Jr., G. W., 1955.—" Intestinal parasitism in an irrigated community of western Nebraska." **4** (5), 901–907.
e. OLIVER-GONZÁLEZ, J., RAMOS, F. L. & COKER, C. M., 1955.—" Serological reactions against egg antigens as an aid in the evaluation of therapy in schistosomiasis." **4** (5), 908–912.
f. BIBAWI, E., EL-DEEB, A. A. & MAHFOUZ, M. M., 1955.—" The portal circulation in hepatic fibrosis associated with bilharziasis." **4** (5), 913–922.
g. BURCH, T. A., QUALLS, D. M. & GREENVILLE, H. J., 1955.—" Onchocerciasis in Liberia." **4** (5), 923–929.
h. MARKELL, E. K. & KERREST, J., 1955.—" Treatment of elephantiasis with cortisone in French Oceania. A preliminary report." **4** (5), 930–939.

(330d) Faecal examinations of 1,096 persons in the irrigated area of Scotts Bluff County, Nebraska, showed *Hymenolepis nana* in seven, *Taenia saginata* in two and *Necator americanus*, *Ascaris lumbricoides* and *Enterobius vermicularis* each in four. Seven of the 21 helminth infections occurred in the 58 comprising the imported Mexican labour force. Incidences in urban and rural dwellers were not significantly different. M.MCK.

(330e) Each of 15 individuals with *Schistosoma mansoni* infections received 100 c.c. of fouadin, injected in daily doses of 5 c.c. Subsequent anorexia, vomiting and loss of weight made it advisable to inject on alternate days. All stools became negative for eggs within two weeks after treatment and all but one remained negative. The sera of 13 patients ceased to produce circumoval precipitins by the 183rd day after treatment but sera of untreated patients remained active. The two treated patients whose sera remained positive probably represented treatment failures. Skin reactions to antigens prepared from schistosome eggs were negative before fouadin administration but positive in 11 out of 14 patients tested 183 days after treatment. This change in skin reaction suggests a skin sensitization produced by the drug, but not necessarily that therapy was successful. M.MCK.

(330f) Bibawi *et al.* report some of the findings of 12 tests performed on 50 patients with hepatic fibrosis associated with *Schistosoma mansoni* infections, and on 20 normal control cases in Egypt. Seven of the 50 cases showed haematemesis, 15 showed oesophageal varicosities and 27 had collateral veins in the anterior abdominal wall. Splenic venography, conducted on ten cases, usually showed portal hypertension. M.MCK.

(330g) Nodules were palpated in 19·4% of 2,423 labourers from the Firestone Plantation at Harbel, Liberia. *Onchocerca volvulus* was found in the nodules of 64 out of 66 individuals specially examined and in a further eleven who had no demonstrable microfilariae. Scarification smears of 696 Africans revealed microfilariae of *O. volvulus* in 23·6%; but skin biopsy showed 34·9% to be positive and 1·9% to have infections of *Wuchereria bancrofti* or *Acanthocheilonema perstans*. The incidence of microfilariae, determined by a combination of both tests, was 39·9%. Among 834 tribal natives, *O. volvulus* was present in 28·1% of the inland dwellers and 8·9% of the coast dwellers and *W. bancrofti* in 2·4% and 12·6% respectively. M.MCK.

(330h) Markell & Kerrest have found that cortisone treatment softens elephantoid tissue. Eight patients with severe elephantiasis received 100 mg. of cortisone daily, in divided doses, for 30 days or longer. Dosages were then decreased stepwise before being discontinued. Marked diuresis ensued before the tissue softening. Although induration reappeared or increased at the end of therapy, re-treatment seemed beneficial. Of the two cases of failure, one had arteriosclerotic heart disease and the results were therefore inconclusive, and the other had advanced verrucous changes in the elephantoid tissue. The microfilariae present in one case markedly increased during treatment but decreased as induration set in. This, and the occurrence of diuresis, suggest that cortisone reduces the inflammatory blockages of the lymphatics. It is recommended that in most cases bandage therapy should accompany the treatment. M.MCK.

330—American Journal of Tropical Medicine and Hygiene. (cont.)

i. MAGATH, T. B. & THOMPSON, Jr., J. H., 1955.—" The effect of irradiation of *Trichinella spiralis* on immunity and its public health implication." **4** (5), 941–946.
j. BROWN, H. W., 1955.—" Therapy of ascariasis with piperazine." **4** (5), 947–952.
k. ALICATA, J. E. & DAJANI, S. W., 1955.—" A brief survey of intestinal parasites of man in the Hashemite Kingdom of Jordan." **4** (6), 1037–1041.
l. HSÜ, H. F., HSÜ, S. Y. LI & RITCHIE, L. S., 1955.—" Epidemiological study on schistosomiasis japonica in Formosa." **4** (6), 1042–1048.
m. MILLER, M. J. & LYON, H. P., 1955.—" Treatment of vesical schistosomiasis with stibophen." **4** (6), 1049–1056.

(330i) In two similar experiments, Magath & Thompson showed that the feeding of irradiated *Trichinella spiralis* larvae to rats confers no demonstrable immunity. In the first experiment, each of 35 rats was fed with a piece of rat diaphragm containing about 500 larvae irradiated with 30,000 roentgen units. Seemingly a few adults developed but no second-stage larvae were found. Rats fed on non-irradiated pieces of infected diaphragm became normally infected. About seven weeks after the first feeding, each of the surviving rats was given 5,000 non-irradiated larvae by stomach tube. This time the test rats developed heavy infections of second-stage larvae, whereas the controls showed no migrating larvae from the second feed but had heavy infections from the first feed. It is considered that the irradiation of pork for human consumption in the U.S.A. would reduce the acquisition of immunity in the consumer and would possibly cause an increase in their clinical manifestations. M.McK.

(330j) To test the efficacy of short-term treatment with piperazine for *Ascaris lumbricoides* in children, Brown administered a flavoured syrup containing the citrate (an equivalent of 100 mg. of piperazine hexhydrate per c.c.). For one and two-day treatments, 20 c.c. to 35 c.c. were given once daily according to weight; the rate for a five-day treatment was 5 c.c. to 20 c.c. per day. The number cured by the one, two, and five-day treatments was, respectively, 34 out of 46, 49 out of 53 and 33 out of 36. One patient experienced nausea and abdominal cramp. It is considered that the two-day therapy gives the best results. The doctor need give only one dose, the patient taking the second himself. M.McK.

(330k) In single stool examinations of 125 Arabs in Jerusalem and 300 in Amman, the incidence of helminth infection was: *Ascaris lumbricoides* in 251 (77·6% in Jerusalem and 51·3% in Amman), *Trichuris trichiura* in 231 (78·4% in Jerusalem and 44·3% in Amman), *Strongyloides stercoralis* in three, *Trichostrongylus* sp. in two, *Taenia* sp. in seven and *Hymenolepis nana* in seven. Hookworm was peculiarly absent. The incidence is low considering the favourable conditions for infection. M.McK.

(330l) Among 12,591 stools examined from 4,197 persons in Formosa, no definite case of *Schistosoma japonicum* infection was found in spite of its presence there in the small wild mammals, *Rattus rattus* (8·6%), *R. norvegicus* (21·5%), *R. losea* (16·4%), *Mus formosanus* (12·5%) and *Crocidura murina* (18·6%) as well as in dogs, water buffaloes, pigs, goats and the vector, *Oncomelania formosana*. The intradermal test for *S. japonicum*, performed on 2,562 persons, was positive in 214 but the stools of these, when re-examined by the sedimentation, acid-ether and hatching techniques, gave no positive result. The *S. japonicum* found in Formosa seems therefore to be a non-human strain. M.McK.

(330m) Five treatment schedules using the trivalent antimonial stibophen, injected intramuscularly, were tested against *Schistosoma haematobium* infections in 207 labourers at the Firestone Plantation, Harbel, Liberia. This locality is not endemic for schistosomiasis. The most successful was the injection of 7 c.c. to 10 c.c., according to weight, on each of two successive days, repeated after a rest period of two to four days. Eggs were absent in the urine of 56 out of 71 patients of this group after six months. Anorexia, vomiting, weakness and skin eruptions were observed and were correlated with the size and frequency of the dose. M.McK.

330—American Journal of Tropical Medicine and Hygiene. (cont.)

n. DIMMETTE, R. M. & SPROAT, H. F., 1955.—" Recto sigmoid polyps in schistosomiasis. I. General clinical and pathological considerations." **4** (6), 1057–1067.
o. BADRAN, A., EL ALFI, O., PFISCHNER, W. C., KILLOUGH, J. H., & BURNS, T. W., 1955.—" The value of routine rectal biopsy in the diagnosis of schistosomiasis." **4** (6), 1068–1071.
p. DAUGHERTY, J. W., 1955.—" The effect of *Schistosoma mansoni* infections on liver function in mice. II. Further studies on intermediary metabolism." **4** (6), 1072–1079.
q. SADUN, E. H., CHAMNARNKIT, C. & CHETANASEN, S., 1955.—" Studies on the treatment of *Opisthorchis viverrini* in human infections with quinacrine hydrochloride and chloroquine phosphate." **4** (6), 1080–1087.
r. HOEKENGA, M. T., 1955.—" Treatment of multiple worm infections with piperazine citrate." **4** (6), 1088–1090.

(330n) Of the 159 polypoid schistosome lesions obtained surgically or recovered at necropsy the site involved was rectum 60·6%, sigmoid 12% and rectosigmoid 27%. The diagnosis of polyps of the colon necessitated the use of the proctosigmoidoscope. Digital examination was of no value. 74·8% of the polyps contained *S. mansoni* eggs, 30·2% contained *S. haematobium* eggs and the eggs of both species occurred in 17·6%. Worms were found in less than 2%. R.T.L.

(330 o) Comparing rectal biopsy and urine analysis for the diagnosis of *Schistosoma haematobium* infection, Badran *et al.* found 33 out of 100 Egyptians, mostly villagers, positive to single or repeated urine analyses; 60 were positive to rectal biopsy. Only three had eggs in the urine and not in the rectal sample. In their opinion rectal biopsy is the method of choice for diagnosing vesical schistosomiasis. M.MCK.

(330p) Daugherty has demonstrated that in aqueous homogenates of the livers of mice six or seven weeks after infection with 150–160 cercariae of *Schistosoma mansoni*, oxidation of succinic acid was reduced although endogenous respiration was little affected. The collagen content, and to some extent the nitrogen content, were increased. Preliminary experiments showed tyrosinase activity to be unaffected but the glycolytic activity to be somewhat reduced. M.MCK.

(330q) Sadun *et al.* tested quinacrine hydrochloride and chloroquine phosphate for the treatment of *Opisthorchis viverrini* infections. Eight individuals received the quinacrine by the mouth without effect. As the first results of the oral administration of chloroquine phosphate indicated the need of a longer and more intensive course of treatment 6·9 gm. of chloroquine base were given over a period of 20 days to two patients and 7·8 gm. over a period of 23 days to 21 patients. Most of them registered an increase in the egg outputs, which in the two most marked cases rose from 1,600 e.p.g. to 30,800 e.p.g. and from 4,000 e.p.g. to 72,400 e.p.g. At the end of treatment, ten patients were negative for *Opisthorchis* eggs, eleven had a lower and two a higher egg count than before treatment. Of the 20 cases examined by smear 10–90 days after treatment, the negative were still negative, three showed markedly increased egg outputs and the others still passed far fewer eggs. M.MCK.

(330r) To ascertain the shortest course of treatment, or the smallest effective dose, for ascariasis and the rate of cure for other intestinal infections, 95 Honduras labourers were given piperazine citrate either as a syrup or in capsules (5 ml. of the syrup or one capsule contained the equivalent of 500 mg. of piperazine hexahydrate). The ascaricidal effect was outstanding even in three days whether given twice daily or in a single daily dose, either in syrup or in capsule. The effect on *Necator americanus* was negligible. In whipworm infections a cure rate of 25% only was reached when treatment was continued for six to ten days. R.T.L.

330—American Journal of Tropical Medicine and Hygiene. (cont.)

s. FREYTAG, R. E., HUNTER, III, G. W. & RITCHIE, L. S., 1955.—" Studies on schistosomiasis. VII. Observations on some surfactants for dispersing insoluble molluscicides." **4** (6), 1119–1124.

(330s) Twenty-two emulsifiers, mostly non-ionic, were tested in various concentrations for their efficacy as surface-active agents in converting seven insoluble chlorinated phenol derivatives into compounds readily and uniformly applicable as dispersible molluscicides in field plots. Of the four preparations with the best dispersing properties, Tergitol NPG was the most versatile and yielded five dispersions, while Polyethylene glycol 600 or 400, Antarox A-400 and Antarox B-201 yielded only three dispersions for the seven insoluble molluscicides tested. Of these, paratertiary butylphenol proved the most readily dispersible. R.T.L.

331—American Journal of Veterinary Research.

a. HALLORAN, P. O'C., 1955.—" A bibliography of references to diseases of wild mammals and birds." **16** (61, Pt. 2), xii+465 pp.

332—American Midland Naturalist.

a. SHAVER, R. J. & MIZELLE, J. D., 1955.—" Effects of rapid and ultra-rapid freezing on *Trichinella spiralis* larvae from guinea pigs and rats." **54** (1), 65–77.
b. GREER, K. R., 1955.—" Yearly food habits of the river otter in the Thompson Lakes region, northwestern Montana, as indicated by scat analyses." **54** (2), 299–313.
c. ABDEL-MALEK, E. T., 1955.—" Anatomy of *Biomphalaria boissyi* as related to its infection with *Schistosoma mansoni*." **54** (2), 394–404.
d. VOGE,.M., 1955.—" A list of cestode parasites from California mammals." **54** (2), 413–417.

(332a) Experiments indicated that *Trichinella spiralis* larvae from rats are more resistant to low temperatures than those from guinea-pigs and that the rat is the more susceptible animal. Exposure for one minute to −22°C., rapidly attained, is 100% lethal to larvae from guinea-pig diaphragms but not from rat diaphragms. Exposure to −32°C. for one minute is lethal to larvae from rats. Excysted trichina larvae were killed when exposed to 3°C. (in 0·85% NaCl) for 30 days. Glycerol was better than saline as a suspension medium for infecting animals experimentally. Exposure to −28°C. for one minute in conjunction with dehydration in 50% glycerol for five minutes was lethal to trichina larvae from guinea-pigs and rats regardless of thawing procedures. R.T.L.

(332b) In this account of a detailed investigation into the diet of *Lutra canadensis* in the region of the Thompson and Gary Lakes in Montana it is mentioned that proglottides of *Ligula intestinalis* were found in otter scats from both areas. R.T.L.

(332c) In the first part of this paper Abdel-Malek gives a detailed and illustrated description of the anatomy of *Biomphalaria boissyi*. Contrary to other observations there is no septum separating the posterior from the anterior part of the snail's body and the so-called septum is only a membrane forming the distal limit of the respiratory sac. In the second part he describes the migrations of sporocysts of *Schistosoma mansoni* through the snail's tissues. Most of the miracidia settle close to the site of entry in the head-foot organ, the mantle collar or the pseudobranch and the mother sporocysts are formed there. Daughter sporocysts are motile and move at random through the tissues or are carried by the blood to various organs. The digestive gland and ovotestis provide the most favourable environment for subsequent development of daughter sporocysts and this accounts for the fact that most are found there. S.W.

(332d) The cestodes of mammals of California are listed separately under their systematic groups and under their hosts. The list contains a large number of new records for the State and for new localities within the State. R.T.L.

333—Anais do Instituto de Medicina Tropical. Lisbon.

a. CAMBOURNAC, F. J. C., GÂNDARA, A. F. & PENA, A. J., 1955.—"Inquérito sobre bilharziose vesical e parasitoses intestinais nas áreas administrativas de Cuchi, Menongue e Longa (Angola)." **12** (4), 549–574. [English & French summaries pp. 572–573.]

b. CASACA, V. R. & CARVALHO, A. M. DE, 1955.—"Prospecção das endemias reinantes na área de Vila Salazar (Dalatando-Angola)." **12** (4), 575–591. [English & French summaries p. 591.]

c. FRANCO, A., 1955.—"A ancilostomíase em Santiago." **12** (4), 633–651. [English & French summaries p. 650.]

d. PINTO, A. R., 1955.—"Nota prévia sobre a incidência da bilharziose na Guiné Portuguesa." **12** (4), 653–658. [English & French summaries pp. 656–657.]

e. SANTOS RÉIS, C. M., 1955.—"Alguns aspectos da filariase perstans em Mocímboa da Praia." **12** (4), 659–690. [English & French summaries pp. 685–688.]

f. SANTOS DIAS, J. A. T., 1955.—"Duas novas espécies de microfilaria parasitas do *Raphicerus campestris zuluensis* Roberts, 1946." **12** (4), 713–719. [English & French summaries pp. 718–719.]

(333a) A survey of 739 natives in southern Angola showed eggs of *Schistosoma haematobium* in the urine of 240 and of *Ancylostoma duodenale* in the faeces of 326. Cambournac *et al.* give details of the blood pictures and figure two simple-tailed xiphidiocercariae found in [unnamed] snails in the district. M.MCK.

(333b) In an area around Vila Salazar in Angola, 31·8% of 500 natives showed eggs of *Schistosoma haematobium* in the urine. Faecal examinations revealed *Ancylostoma duodenale* in 424, *Ascaris* in 275, *Trichuris trichiura* in 130 and *Heterodera radicicola* in four. *Physopsis globosa*, *Planorbis pfeifferi*, *Physa* spp. and *Limnaea* were collected in the area; 70 out of 100 *Physopsis globosa* and four out of 40 specimens of *Physa* spp. contained schistosome sporocysts and cercariae. M.MCK.

(333c) Of 876 inhabitants examined on the island of Santiago, Cape Verde, 329 were passing hookworm ova. Of those infected only 14 or 15 had visited endemic areas outside the island and many followed the local custom of eating earth. M.MCK.

(333d) In Portuguese Guinea vesical schistosomiasis is concentrated in the basins of the Caiomete, Cacheu and Geba and part of the Corubal basin. Incidence in these basins, determined by examining a total of 2,138 children, ranged between 13% and 54%. No schistosome cercariae were seen in 3,200 *Bulinus* (seemingly *B. senegalensis*) taken in the area although many were from waters frequented by infected persons; however, of about 300 laboratory specimens exposed daily to miracidia, one became infected. Human-type cercariae obtained from local *Physopsis africana* gave rise in the rat to adult *Schistosoma haematobium*. Pinto records (i) from the *Bulinus* sp. above, two xiphidiocercariae of which one had eyespots, (ii) from *Planorbis* sp. a furcocercaria, with eyespots, and a xiphidiocercaria and (iii) a furcocercaria which gave rise in the rat to adults similar to *S. bovis*, and one xiphidiocercaria, from *Physopsis africana*. Other local molluscs were *Limnaea caillaudi* and *Lanistes ovum*. M.MCK.

(333e) Microfilariae of *Dipetalonema perstans*, recorded apparently for the first time from Mozambique, were found in 322 cases during the course of 5,295 blood examinations. Microfilariae of *Loa loa* were found in 17 and of *Wuchereria bancrofti* in 14. In seven cases of *D. perstans* infection, dosages of hetrazan ranged from 6·4 mg. to 15·3 mg. per kg. body-weight per day and were given for three to eighteen days. The rate of 6·4 mg. was ineffective and that of 14·8 mg. [14·6 mg. in the summaries] was slightly toxic in one case. In five persons the blood infection disappeared but two required treatment with tartar emetic. M.MCK.

(333f) Santos Dias describes and figures two unsheathed microfilariae from *Raphicerus campestris zuluensis* in Mozambique, viz., *Microfilaria raphiceri* n.sp., 123·5–141·5 μ in length, which resembles that reported by Schwetz & Collart (1929) from *Cobus vardoni* in the Belgian Congo; and *M. mossambica* n.sp., 199·0–203·5 μ in length. The large microfilaria resembles that found by Neitz (1931) in *Tragelaphus scriptus sylvaticus* in Zululand. M.MCK.

334—Anales de la Escuela Nacional de Ciencias Biológicas. Mexico.

a. CABALLERO Y C., E., 1955.—"Hirudíneos de México. XIX. Presencia de *Pontobdella macrothela* Schmarla, 1861, en aguas marinas del Golfo de México." **8** (3/4), 153–158. [English summary p. 157.]
b. FLORES-BARROETA, L., 1955.—"Helmintos de los perros *Canis familiaris* y gatos *Felis catus* en la Ciudad de México." **8** (3/4), 159–202. [English summary pp. 199–200.]
c. KHERA, S., 1955.—"On some species of *Procamallanus* Baylis, 1923 from India." **8** (3/4), 243–252. [Spanish summary pp. 251–252.]

(334a) The single specimen of *Pontobdella macrothela* described is apparently the first of this species of leech to be reported from the Gulf of Mexico. As somites VIII–XII were irregularly subdivided the genital pores were unusually placed. M.MCK.

(334b) In a survey of the helminths of 100 dogs and 100 cats from the city of Mexico, Flores-Barroeta describes *Filaroides pararostratus* n.sp. from the trachea of the dog. It is differentiated from *F. rostratus* by the presence of two, instead of four, pairs of post-anal papillae, by the structure of the spicules, which do not bifurcate distally, and by the shape of the gubernaculum. The incidence in dogs was: *Ancylostoma caninum* 55%, *Dipylidium caninum* 40%, *Spirocerca lupi* 35%, *Toxocara canis* 30%, *Filaroides pararostratus* 1%, *Taenia serialis* 6% and *Taenia echinococcus* 1%. In cats it was: *D. caninum* 50%, *Toxocara mystax* 50%, *Taenia taeniaeformis* 24%, *Ancylostoma caninum* 4% and *Toxocara canis* 2%. This is the first report of *Spirocerca lupi* in dogs in Mexico City. A description is given of all the helminths. M.MCK.

(334c) Three species of *Procamallanus* are described from fishes at Lucknow. *P. gubernaculus* n.sp., found in *Rita rita* is unique in having only a right spicule and gubernaculum. It differs from *P. fulvidraconis* in the presence of a lateral finger-shaped thickening on the inner surface of the buccal capsule, the number of caudal papillae (eleven pairs), and in vulval characters. Khera suspects that the left spicule described by Li for *P. fulvidraconis* is the gubernaculum. *P. aspiculus* n.sp. from *Bagarius bagarius* is represented by a single male which lacks spicules and gubernaculum. The oesophagus has a glandular portion and there are two golf-club-shaped processes in the buccal capsule which is very similar to that of *P. planoratus*. *P. mehrii* Agarwal, 1930 is redescribed and figured from a female found in *Wallagonia attu*. The key given for 27 species of the genus *Procamallanus* is a modification of that by Annereaux (1946). *P. kerri* Pearse, 1933 is excluded as the female only is known. M.MCK.

335—Annales de Parasitologie Humaine et Comparée.

a. TIMON-DAVID, J., 1955.—"Trématodes des goélands de l'île de Riou." **30** (5/6), 446–476. [English summary pp. 473–474.]
b. CAMPANA-ROUGET, Y. & BIOCCA, E., 1955.—"Une nouvelle espèce d'*Anisakis* chez un phoque méditerranéen." **30** (5/6), 477–480.
c. GALLIARD, H., BRYGOO, P. & GOLVAN, Y., 1955.—"Description de la microfilaire de *Wuchereria bancrofti* var. *vauceli* Galliard et Brygoo 1955." **30** (5/6), 481–487.

(335a) Timon-David found 13 species of trematodes in 58 herring gulls (*Larus argentatus michaellis*) from Riou Island, south of Marseilles. Three of these were new to science. *Aporchis massiliensis* n.sp. possesses an extraordinarily elongated body, 14 mm. to 41 mm. long, and recalls a small cestode in general appearance: it most closely resembles *A. rugosus* but may be distinguished by the larger testes which have their long axes placed longitudinally instead of transversely, the spines, the widely different geographical distribution and the host. *Brachylecithum microtesticulatum* n.sp., of which only three specimens were found in the intestine of one gull, has as its most distinctive feature very small testes; its localization in the gut is unusual in members of this genus. *Knipowitschetrema echinatum* n.sp., found in the rectum, is very closely related to *K. nicolaï* but may be distinguished by the possession of well developed cuticular spines, the more elongated body shape, the more anterior position of the acetabular-genital complex, the larger size, the localization in the host and the geographical distribution. Of the other species found, *Stictodora sawakinensis* and *Pachytrema*

calculus are recorded for the first time in France. The distribution of the various species in the host and the frequency of infection are tabulated. The influence of age of the host on the trematode fauna is discussed; *K. echinatum* and *Cryptocotyle jejuna* occurred most commonly in young birds and *Renicola lari* in adults. There are a number of illustrations. S.W.

(335b) Campana-Rouget & Biocca describe briefly, but do not illustrate, *Anisakis pegreffii* n.sp. from *Monachus albiventer* in the Mediterranean. Only four other species of *Anisakis* have been described from Pinnipedia; *A. pegreffii* can be distinguished from these by the possession of long, thin, curved spicules which are unequal in size, the left measuring 2·27 mm. and the right 1·35 mm. S.W.

(335c) Galliard *et al.* describe in greater detail the microfilaria of *Wuchereria bancrofti* var. *vauceli* from man in Madagascar. [For abstract of preliminary account see Helm. Abs., **24,** No. 207 l.] The somatic nuclei are arranged more or less in a compact mass as in *Mf. malayi* but the arrangement of the caudal nuclei resembles that in *Mf. bancrofti*. In *malayi* and *vauceli* the excretory pore is voluminous and the excretory cell large whereas in *bancrofti* both are small; the excretory cell and pore are close in *bancrofti*, far apart in *malayi* and intermediate between these two positions in *vauceli*. The anal pore in *bancrofti* is much smaller than in the other two microfilariae and the genital cells have a distinct appearance and arrangement in all three. The paper is illustrated by one table and a series of comparative drawings. S.W.

336—Annales de la Société Belge de Médecine Tropicale.

a. DEMAEYER, E. M., CHARDOME, M. & PEEL, E., 1955.—" Enquête parasitologique et variations de la protéinémie en fonction de l'altitude chez les indigènes de la région de Katana-Lwiro." **35** (3), 293–313. [English & Flemish summaries pp. 307–308.]
b. FAIN, A., 1955.—" Une nouvelle bilharziose des oiseaux: la trichobilharziose nasale. Remarque sur l'importance des schistosomes d'oiseaux en pathologie humaine. Note préliminaire." **35** (3), 323–327. [Flemish summary p. 327.]
c. ANDRÉ, J. & HOLEMANS, K., 1955.—" Signification des cheveux roux chez le nourrisson noir du Kwango." **35** (5), 467–477. [Flemish summary p. 477.]
d. D'HAENENS, G. & SANTELE, A., 1955.—" Sur un cas humain de *Schistosoma rodhaini* trouvé aux environs d'Elisabethville." **35** (5), 497.
e. GILLET, J., SMET, R. M. DE & NANNAN, P., 1955.—" L'action thérapeutique favorable d'un dérivé du thioxanthone (nilodin) dans la strongyloïdose." **35** (5), 499–503. [Flemish summary p. 503.]
f. HERIN, V., THIENPONT, D. & FAIN, A., 1955.—" Filarioses des bovidés au Ruanda-Urundi. I. Etude clinique." **35** (5), 505–521. [Flemish summary pp. 520–521.]
g. HERIN, V. & FAIN, A., 1955.—" Filarioses des bovidés au Ruanda-Urundi. II. Etude histopathologique." **35** (5), 523–533. [Flemish summary pp. 531–532.]
h. FAIN, A. & HERIN, V., 1955.—" Filarioses des bovidés au Ruanda-Urundi. III. Etude parasitologique. A. Note sur *Parafilaria bovicola* Tubangui, et description de deux filaires nouvelles." **35** (5), 535–554. [Flemish summary p. 547.]
i. FAIN, A., HERIN, V. & THIENPONT, D., 1955.—" Filarioses des bovidés au Ruanda-Urundi. III. Etude parasitologique. B. Filaires des genres *Setaria* et *Onchocerca*, et microfilaires sanguines et dermiques." **35** (5), 555–583. [Flemish summary p. 578.]
j. FAIN, A., 1955.—" Sur une furcocercaire du groupe Ocellata produisant expérimentalement la 'dermatite des nageurs' à Astrida (Ruanda-Urundi)." **35** (6), 701–707. [Flemish summary p. 706.]
k. LAGRANGE, E., 1955.—" Considérations sur la pathologie de la bilharziose à *Schistosoma mansoni*." **35** (6), 719–724. [Flemish summary p. 724.]
l. PIETERS, G., 1955.—" La cysticercose chez le Congolais." **35** (6), 751–755. [Flemish summary p. 754.]

(336a) Demaeyer *et al.* have studied three groups of a genetically homogeneous population living at altitudes of 6,500, 5,500 and 4,800 feet respectively, and compare the degrees of parasitism with the blood pictures and serum protein compositions. *Acanthocheilonema perstans* was the commonest filaria, the incidence varying from 31% to 51%. Intestinal helminths occurred in about 88% of each group; the incidence of hookworms varied from 1·98% to 4·6% but the numbers infected were too small to detect any relationship with the blood

picture. There appeared to be no relation whatever between *A. perstans* infection and the blood picture or serum protein level and the authors conclude that malaria, combined with an unbalanced diet, is responsible for the normochromic anaemia and decrease in the albumin fraction of the serum which was observed. S.W.

(336b) Fain has found three new species of *Trichobilharzia* (to be described elsewhere) in the nasal mucus of ducks and geese in the Belgian Congo. The adult schistosomes were restricted to the small veins of the mucous membrane on the turbinal bones and in the nasal fossae, mainly close to the nares; they did not occur in the liver or mesenteric veins. The eggs are eliminated in the nasal mucus. The infection in aquatic birds appears to be very widespread. He discusses the probability that schistosome dermatitis does occur in central Africa, although not yet recorded there, and draws attention to the close resemblance between cercariae of *Schistosoma* spp. and *Ornithobilharzia*. S.W.

(336c) The presence of intestinal worms can cause protein deficiencies which seem to decrease the pigmentation of the hair. In 642 native children aged 0–3 years from the Belgian Congo, the incidence of intestinal worms, as determined by faecal smears, was *Ascaris* 68%, *Ancylostoma* 12% and of both species 17%. Although the frequency in those with black hair and those with other than black hair was not substantially different, André & Holemans consider that some correlation cannot be ruled out. M.McK.

(336d) The presence of *Schistosoma rodhaini* eggs in the faeces of rats and *Dasymys* caught near Elisabethville, Belgian Congo, led to the examination of 40 natives living along the river. One definite case of infection was found. Two others discovered previously, unknown to the authors, are also reported. M.McK.

(336e) The thioxanthone derivative nilodin was tested in *Strongyloides stercoralis* infections in natives in the Belgian Congo. Two doses, each of 5 mg. to 20 mg. per kg. bodyweight, were given by the mouth daily for six days. Rates of 15 mg. to 20 mg. cured 26 out of 27 persons, their faeces being devoid of eggs during the 14 days they were examined after treatment. The administration for two days of 16 mg. to 20 mg. per kg. per day, divided into two doses, cured 145 out of 152 persons. No ill effects were observed. M.McK.

(336f) The authors summarize their clinical observations on two new skin diseases observed in cattle at Astrida as follows: (i) one is a lightly pruriginous pseudomangy dermatitis characterized by hyperkeratosis with bristling of the hair at the level of the upper parts of the body, or by symmetrical bald patches accompanied by pityriasis on the upper parts of the forehead, and also by atrophy and narrowing of the base of the horns, weakening them to the point of easy accidental breakage. These cutaneous lesions are usually of small size, save at the level of the head, where they are often very extensive. Their development is chronic and they are refractory to ixodicidal preparations and various insecticides and dipping. Rare in young cattle, their frequency increases with age. The authors find that *Onchocerca gutturosa* is wide-spread among adult cattle at Astrida and believe that these cutaneous lesions are produced by the larvae of this nematode. They base their opinion particularly on the fact that the larvae of *O. gutturosa* are much more frequent and numerous in the lesions than in other parts of the body. (ii) The second new cutaneous disease described is parasitic ulcer of cattle. This affliction is characterized by a skin ulceration of seasonal character, found mainly in the umbilical region and is difficult to cure. The causal agent is a new filarioid larva present in all the ulcers and described later [*Agamofilaria boophaga* n.sp. see No. 336h below]. M.McK.

(336g) Herin & Fain describe, from histological sections, the ulcers and lesions of the two filarial skin diseases of cattle previously reported [see No. 336f above]. The ulcers consisted of tissue riddled by the paths of microfilariae. Older microfilariae were dead and were being gradually replaced by granular tissue. The lesions associated with the mangy type of

dermatitis contained numerous microfilariae down to the level of the sebaceous glands and were characterized by moderate hypertrophy with excessive keratinization and dermopapillary congestion. In the areas showing photodermatosis on the head of one cow microfilarial lesions appeared two months later. M.McK.

(336h) The authors recall that the presence in Central Africa of *Parafilaria bovicola* and the associated cutaneous haemorrhages in cattle were first recorded by Fain & Deramée in 1949. Two new species of filarial worms are now reported from cattle at Astrida in Ruanda-Urundi, viz., (i) an immature form, named *Agamofilaria boophaga* n.sp., resembling *P. bovicola* in several morphological features. It is 3·5 to 5·1 mm. long with a transversely striated cuticle and is the causal agent of an ulcerative condition of the skin resembling the cutaneous habronemiasis of horses. (ii) *Dipetalonema ruandae* n.sp. This is found frequently in the perioesophageal cellular tissue, in the skin and, on one occasion, was found under the conjunctiva. The female is 28·5 to 35 mm. long. The microfilaria is sheathed and measures 0·17 to 0·195 mm. in length. The male is 12·5 to 18 mm. long with a spiral tail ventrally marked like *D. blanci*. There are three pairs of pre-anal and five pairs of post-anal papillae. The right spicule is 0·06 to 0·07 mm. long with a filamentous distal portion and a fusiform swelling at its junction with a cylindrical proximal portion. A gubernaculum is absent. A large number of measurements of the slightly different forms found in the oesophagus and in the skin are tabulated [but the new species is not specifically differentiated from allied species]. R.T.L.

(336i) In *Setaria cervi* from cattle in Ruanda-Urundi the two lateral cephalic papillae recorded by Thwaite are now recognized as amphids. There is a hitherto unnoted membranous prolongation of the left spicule which may reach 0·3 mm. in length. The microfilaria which has not been described previously is 0·24–0·26 mm. long, is sheathed and has no periodicity. It was found on six occasions when the blood of 23,023 cattle was examined at Astrida. *Onchocerca gutturosa* occurred in 40% of the 934 cattle examined. The microfilariae were obtained from the serum of the skin especially where there were scabby lesions near the horns and on the back. Detailed measurements are tabulated. It is noted that the microfilariae taken from the female worms are longer than those found in the skin. The adults are also described at length. The cuticular annulations do not encircle the body but are broken at the sides. *O. gibsoni*, which has been recorded by Rodhain & Gillain from a Cape buffalo in Haut-Ituri was found once only in a cow but *O. armillata* was frequently observed within the wall of the aorta in cattle slaughtered at Astrida. The microfilaria of *Dipetalonema ruandae* was obtained from the serum of the skin of a few animals. It is sheathed and measures 0·152–0·198 mm. in length. Details are shown on a plate. R.T.L.

(336j) Fain describes and illustrates *Cercaria herini* n.sp. from *Limnaea natalensis undussumae*. It belongs to the *ocellata* group and is probably the larva of one of the eight species of *Trichobilharzia* described from Ruanda-Urundi. The whole body is covered with spines directed posteriorly and these are larger and more widely spaced on the tail; on the ventral side of the anterior part of the body are eight very fine tactile hairs arising from tiny papillae. When placed on the skin of a European volunteer the cercariae produced dermatitis accompanied by violent pruritus. S.W.

(336k) Lagrange summarizes his observations, made over eight years, on the pathology of *Schistosoma mansoni* in laboratory animals and the clinical observations made during a short visit to Africa. In heavily infected mice the liver presents a pseudo-tuberculous appearance, the spleen becomes hypertrophied and the mice are more susceptible to other infections. Albino rats are generally refractory to infection. In *Sigmodon hispidus* the schistosome does not provoke the same liver reaction as it does in the mouse. Guinea-pigs never pass schistosome eggs in the faeces and are spontaneously cured after a few months. In a large part of the Congo region and inter-tropical Africa there are numerous cases of intestinal schistosomiasis with and without symptoms and cirrhosis of the liver may or may not coincide

with the presence of *S. mansoni* eggs in the stools. The author discusses the other possible causes of liver cirrhosis and mentions cases from an endemic area in which no schistosome eggs could be found. S.W.

(336l) Pieters briefly discusses the pathogenicity of cysticerciasis in man, the various ways in which the infection is acquired and the commonest localizations for the cysts. He annotates seven cases he observed in natives from the Madimba region in which cysts were subcutaneous or in the superficial muscles; there were no concomitant morbid phenomena. The infection is relatively common in the Bas-Congo district. S.W.

337—Annals of Applied Biology.

a. WALLACE, H. R., 1955.—" The influence of soil moisture on the emergence of larvae from cysts of the beet eelworm, *Heterodera schachtii* Schmidt." **43** (3), 477–484.
b. BISHOP, D., 1955.—" The emergence of larvae of *Heterodera rostochiensis* under conditions of constant and of alternating temperature." **43** (4), 525–532.

(337a) The emergence of larvae of *Heterodera schachtii* from cysts in water in various atmospheres of oxygen-nitrogen mixtures showed a high correlation with oxygen concentration. When the moisture characteristics of a mass of 800 cysts and of sand of similar particle size were compared, it was found that the water was removed from between particles at 12–16 cm. of water-pressure deficiency. With increasing suction, water was only gradually removed from cysts, but between 100 cm. and 135 cm. of water suction it appeared to be removed from between the eggs in the cyst. Larval emergence was optimal at about 18 cm. pressure deficiency and declined as deficiency increased. Eggs within cysts are surrounded by water between 0 cm. and 100 cm. of pressure deficiency. By placing cysts in moist sand on inverted sintered glass funnels subjected to different pressure deficiencies, it was shown that egg hatch was not directly dependent on pressure deficiency but that the presence of free larvae within the cyst inhibited further hatch. In another experiment larvae were placed in the centre of the sheet of sand on inverted sintered glass funnels and subjected to different pressure deficiencies and their motility measured by counting their numbers in concentric rings of sand. Here low rates of larval emergence at high pressure deficiencies appeared to be due to the inability of the larvae to migrate from the cysts because of surface tension forces. J.B.G.

(337b) After batches of cysts of *Heterodera rostochiensis* had been soaked for five days in water, diffusate was substituted and the cysts subjected to (i) constant temperature of 25°C.; (ii) daily alternation of 19 hours at 25°C. and five hours at 15°C.; (iii) 24 hours at 25°C. and 24 hours of which the first five hours were at 15°C. Under these conditions there was a significant increase in larval emergence from the "alternated" cysts. When anhydrotetronic acid was the stimulant, there was maximum stimulation at a concentration of 1:500. J.B.G.

338—Annals of Biochemistry and Experimental Medicine.

a. SAHA, K. C. & SEN, D. P., 1955.—" Gammexane in the treatment of argulus and fish leech infection in fish." **15** (1), 71–72.

(338a) In West Bengal the leech *Hemiclepsis marginata* causes death among the carp fingerlings of 2 to 2½ inches in length. A single treatment with gammexane in a concentration of 0·5 p.p.m. cured most of the fish. After a second application the mortality was completely checked and no sign of infection could be detected. Even in a concentration of 1 p.p.m. carp one to ten inches long suffered no detrimental effects. R.T.L.

339—Annals of Internal Medicine.

*a. JOHNSTON, D. W., 1955.—" Chyluria: case report and review of literature." **42** (4), 931–937.

340—Annals of Tropical Medicine and Parasitology.

a. WEBBER, W. A. F., 1955.—" The filarial parasites of primates: a review. II. *Loa*, *Protofilaria* and *Parlitomosa*, with notes on incompletely identified adult and larval forms." **49** (3), 235–249.
b. DUKE, B. O. L., 1955.—" Studies on the biting habits of *Chrysops*. II. The effect of wood fires on the biting density of *Chrysops silacea* in the rain-forest at Kumba, British Cameroons." **49** (3), 260–272.
c. SILVERMAN, P. H. & MANEELY, R. B., 1955.—" Studies on the biology of some tapeworms of the genus *Taenia*. III. The rôle of the secreting gland of the hexacanth embryo in the penetration of the intestinal mucosa of the intermediate host, and some of its histochemical reactions." **49** (3), 326–330.
d. DUKE, B. O. L., 1955.—" Studies on the biting habits of *Chrysops*. III. The effect of groups of persons, stationary and moving, on the biting density of *Chrysops silacea* at ground level in the rain-forest at Kumba, British Cameroons." **49** (4), 362–367.
e. DUKE, B. O. L., 1955.—" Studies on the biting habits of *Chrysops*. IV. The dispersal of *Chrysops silacea* over cleared areas from the rain-forest at Kumba, British Cameroons." **49** (4), 368–375.
f. McFADZEAN, J. A., 1955.—" Setarial infections in the Gambia, British West Africa." **49** (4), 417–418.
g. SILVERMAN, P. H., 1955.—" Bovine cysticercosis in Great Britain from July, 1950, to December, 1953, with some notes on meat inspection and the incidence of *Taenia saginata* in man." **49** (4), 429–435.
h. SILVERMAN, P. H. & GRIFFITHS, R. B., 1955.—" A review of methods of sewage disposal in Great Britain, with special reference to the epizootiology of *Cysticercus bovis*." **49** (4), 436–450.
i. NICHOLAS, W. L., KERSHAW, W. E. & DUKE, B. O. L., 1955.—" Studies on the epidemiology of filariasis in West Africa, with special reference to the British Cameroons and the Niger delta. VII. Further records of the distribution of *Culicoides* spp., with a note on the taxonomic status of *C. austeni*." **49** (4), 455–460.

(340a) Continuing her review [for abstract see Helm. Abs., **24**, No. 67b] of the filarial parasites of primates other than those found exclusively in man, Webber annotates the species of *Loa*, *Protofilaria* and *Parlitomosa* and other adults and larvae recorded as filarioid worms in primates. All the hitherto recorded species are now tabulated under their hosts. It is concluded that there are only 18 valid species, viz., *Dirofilaria immitis*, *D. corynodes*, *D. schoutedeni*, *D. aethiops*, *D. macacae* (? = *D. repens*), *Dipetalonema gracile*, *D. digitatum*, *D. streptocerca*, *D. marmosetae*, *D. atelense*, *D. parvum*, *D. vanhoofi*, *D. rodhaini*, *D. nicollei*, *D. petteri*, *Loa loa*, *Protofilaria furcata* and *Parlitomosa zakii*. R.T.L.

(340b) To test a local claim that the number of *Chrysops silacea* caught with human bait increased in the presence of a wood fire, catches were made at different stations in the forest by individual boys, with and without a fire, over periods of 18–21 days. The daily catch increased more than sixfold in the presence of a wood fire. Flies were not attracted by fires burning in or above the forest canopy. Subsequent experiments showed that the stimulus is olfactory and is provided by the rising smoke of a wood fire. M.McK.

(340c) The secreting glands of taeniid hexacanth embryos were studied in sections of gravid segments of *Taenia saginata* and *T. pisiformis*. To reduce the distortion and shrinkage of hexacanth embryos which occur during paraffin embedding, the cestode tissue was dehydrated in ascending grades of polyethylene glycol 1000 and embedded in "Nonex". Masson's trichrome method and Pappenheim's methyl-green-pyronin technique as modified by Vogel, stained the two gland nuclei and the polar cells but not the secreting gland itself. The periodic acid-Schiff technique and appropriate control tests demonstrated polysaccharide complexes in the gland substance but not in the nuclei and polar cells. Hatched and activated hexacanth embryos were injected into portions of excised mouse intestine. Sections of these pieces of gut showed that the secreting gland of the embryos had cytolytic properties on the striated border of the epithelial cells of the mucosa and loosened the ground substance between the cells, enabling the embryo to penetrate into the connective tissue core of the villi. The time of initial penetration appeared to be 10 to 40 minutes after the introduction of the embryos into the gut lumen. M.McK.

(340d) Boys trained to rove in groups through the forest in a manner similar to *Mandrillus leucophaeus* (a potential reservoir of *Loa loa*) caught any *Chrysops silacea* that came near. Groups tended to attract more flies per boy per hour than single boys catching alone. For a group of eight, intermittently moving and resting, the number of flies caught per boy hour (F.B.H.) was 0·24; for a similar group of 16 the F.B.H. was 0·33. With stationary boys figures were: 0·25 for single catchers, 0·38 for groups of eight and 0·48 for groups of sixteen. M.MCK.

(340e) The number of *Chrysops silacea* taken near a wood fire in clearings bordered by rain-forest, where the fly breeds, is reported to decrease logarithmically as the distance from the forest increases. In a plantation of rubber saplings 1½–2 ft. high the number of flies caught fell to one tenth of the forest value at a distance of 100 yards (i.e. two flies caught at 100 yards, over a period of twelve days, as compared with 156 in the forest). Among saplings 10–12 ft. high, the calculated distance for the catch to fall to one tenth was 530 yards. *C. silacea* with *Loa loa* infections were found up to 250 yards from the forest edge in the latter plantation, where short flights from one resting place to another were possible, and up to 50 yards in the former area. On organized plantations a barrier 100–200 yards wide might usefully be cleared on forest sides to restrict the dispersal of flies. M.MCK.

(340f) All the adult worms examined from the peritoneal cavity of cattle in Gambia were identified as *Setaria cervi*. In two herds, where the blood was examined, microfilariae were found in 16 out of 21 and 14 out of 46 cattle. No periodicity was observed. At a local abattoir 264 out of 665 beasts had adult *S. cervi*; the infected animals had come from Senegal and Gambia. Examination of worms from Gambia and Japan by Professor Buckley confirmed the presence of two species, those from Gambia being *S. cervi* and those from Japan, *S. digitata*. M.MCK.

(340g) Silverman analyses the records of bovine cysticerciasis collected by the Ministry of Food from 1950 to 1953 when the meat industry was decontrolled. The incidence in the cattle slaughtered monthly ranged between 0·21% and 0·58%. Figures from the more reliable abattoirs suggest the national average may be nearer 0·81% to 3·47%. Infections were light in over 99% of the 5,000–7,000 cases reported annually. There was no evidence of seasonal fluctuation. In an experimental inspection of about 700 carcasses nearly half of the infections were detected through the heart lesion only. The heart is often omitted in routine inspections. Hospital reports to the Central Public Health Laboratories indicate that on an average four tapeworm patients are under treatment each week in England and Wales. M.MCK.

(340h) Analysing the sewage disposal methods used at present in Britain, Silverman & Griffiths conclude that the greater volumes of sewage dealt with, resulting in shortening of clarification processes, and the wide-spread increase in the use of detergents, with consequent interference in sewage treatments, allow tapeworm eggs to survive and issue in final effluent and sludge. To this may be attributed the recent apparent increase in bovine cysticerciasis. Gulls, known eaters of raw sewage in final effluent, were shown to pass ingested tapeworm eggs in a viable state. Droppings of gulls which had been fed with *Taenia saginata* and *T. pisiformis* eggs were given to cattle and rabbits respectively. Taenia infections were produced in both mammals. No ingested Taenia eggs were passed by pigeons or by chicks over about 40 days old. Testing the newly installed and final process of sand filtration at Finham works, Coventry, the authors found in six of the experiments that, of the *T. saginata* and *Ascaris lumbricoides* eggs introduced just before filtration, over 50% filtered through. But 95% of Ascaris eggs and 90% of *T. saginata* eggs (or more) were retained, under laboratory conditions, with "micro-straining" stainless steel gauze, now in wide use in sewage and water filtration plants. M.MCK.

(340i) Extending the records of Nicholas *et al.*, 1953, for *Culicoides* in Nigeria and the British Cameroons, Nicholas and co-workers report nine species with their locality. *C. milnei* was taken for the first time from parts of northern Nigeria where *Acanthocheilonema perstans* is a common human parasite. Study of type material has shown *C. austeni* to be a synonym of *C. milnei*. M.MCK.

341—Antibiotic Medicine. New York.

a. LOUGHLIN, E. H. & MULLIN, W. G., 1955.—"The treatment of enterobiasis with crystalline oxytetracycline." **1** (3), 145–150. [Spanish summary pp. 179–180.]
b. OWINGS, R. S., 1955.—"Pinworms and oxytetracycline—some of the symptoms before treatment." **1** (5), 280–282. [Spanish summary pp. 313–314.]

(341a) Since their previous report on 30 cases of *Enterobius vermicularis* treated with terramycin [for abstract see Helm. Abs., **20**, No. 660b], Loughlin & Mullin have treated 92 patients with crystalline oxytetracycline and of these 88 remained negative to the Scotch tape technique throughout 42 days. This antibiotic has a deleterious effect on the ova and on the fertility of the adults not only of *Enterobius* but also of *Ascaris lumbricoides*, hookworm and *Trichuris trichiura*. Oxytetracycline apparently augments the action on *Ascaris* of certain piperazine compounds. R.T.L.

(341b) Oxytetracycline (terramycin) was administered in four equally divided daily doses to cases with *Enterobius vermicularis*, for a four-day period at the daily rate of 0·5 gm. for those under five years and 1 gm. for those five to twelve years old. Peri-anal examinations of 24 patients by Scotch tape smears during the succeeding fortnight gave only two positive results. Terramycin is effective against the eggs as well as the adults, but its use is limited by its cost unless there is an accompanying infection requiring treatment with a broad-spectrum antibiotic. R.T.L.

342—Antibiotics and Chemotherapy. Washington.

a. REINERTSON, J. W. & THOMPSON, P. E., 1955.—"Effects of JGS-110 (N,N-diethyl-4-methyl-1,4-diaza-cycloheptane-1-carboxamide, hydrochloride) against filariasis in cotton rats." **5** (10), 566–570.
b. RAWSON, G. W., FERRELL, B. D., REYNOLDS, A. C. & MAYER, R. L., 1955.—"The activity of thionocarbanilates including *n*-butyl-*p*-allyloxy thionocarbanilate against mouse pinworms." **5** (11), 622–628.
c. SENECA, H. & BERGENDAHL, E., 1955.—"Toxicity of antibiotics to snails." 5 (12), 737–741.

(342a) Although JGS-110 (N,N-diethyl-4-methyl-1,4-diaza-cycloheptane-1-carboxamide hydrochloride) is only about half as toxic to mice as diethylcarbamazine, it is proportionately only one fourth to one half as active against *Litomosoides carinii* in *Sigmodon hispidus*. It is however the first diazacycloheptane which has been shown to have antifilarial action. Dose rates and experimental details are given. S.W.

(342b) Rawson *et al.* have tested 29 thionocarbanilates, five carbanilates and two dithionocarbanilates against *Syphacia obvelata* and *Aspiculuris tetraptera* in mice. A number of substances, including piperazine hexahydrate, gentian violet and phenothiazine, were used as reference standards; the number of mice entirely cleared of either or both species and the percentage of mice having a total worm burden of five or less were the two criteria of chemotherapeutic activity. Su 2434 (*n*-butyl-*p*-allyloxy-thionocarbanilate) was the most efficacious against both species and was more active than piperazine hexahydrate. *S. obvelata* was more sensitive to most of the drugs than was *A. tetraptera* but two of the drugs were more active against the latter. Su 2434 had a very low toxicity when given orally to mice and a relatively wide margin of therapeutic safety. There are two tables showing the structure of the chemicals tested and their activities against the pinworms and a third sets out the activities of the reference substances. S.W.

(342c) Seneca & Bergendahl have tested 14 antibiotics as molluscicides, using laboratory-bred *Australorbis glabratus*. Thiolutin (produced by *Streptomyces albus*) was the most potent in dilutions of 1:4,000,000 in 12 hours, 1:16,000,000 in 24 hours and 1:32,000,000 in one week. Rimocidin (produced by *S. rimosus*) was lethal in a dilution of 1:256,000 in 24 hours, anisomycin in a dilution of 1:160,000 in 48 hours and nystatin in a dilution of 1:64,000 in one

hour. Anisomycin and nystatin could not be used as practical molluscicides and thiolutin is expensive to make. Rimocidin is a by-product in the production of oxytetracycline, is easy and cheap to manufacture and shows promise as a molluscicide. The ten other antibiotics tested had a very low toxic effect. S.W.

343—Archives of Dermatology.

a. EL-ZAWAHRY, M., 1955.—" Schistosomal granuloma of the skin." **72** (1), 68–69.

(343a) El-Zawahry describes ten cases of schistosomal granuloma of the skin; in most of the cases the lesions were in the perineal region. The diagnosis was confirmed by the finding of ova on rectal biopsy or urine examination. Treatment with tartar emetic or stibophen was successful in all but two cases where surgical intervention was required. S.W.

344—Archives de l'Institut Pasteur d'Algérie.

a. SIMITCH, T. & PETROVITCH, Z., 1955.—" La faune des parasites intestinaux en Yougoslavie. II. La faune des helminthes intestinaux chez les enfants d'âge scolaire." **33** (3), 264–268.

(344a) Simitch & Petrovitch examined 7,266 schoolchildren in 133 localities in Yugoslavia and record *Taenia saginata*, *Hymenolepis nana*, *Enterobius vermicularis*, *Ascaris lumbricoides*, *Trichuris trichiura* and *Trichostrongylus* sp. The intensity of infection varied greatly in different districts. The apparent absence of *Taenia solium* and *Strongyloides stercoralis* may possibly be attributed to the limitations of the diagnostic techniques used. S.W.

345—Archives de l'Institut Pasteur de la Guyane Française.

a. FLOCH, H., 1955.—" Discussions sur la 'leishmaniose cutanéo-muqueuse' et la 'filariose clinique'." XVI Année, No. 351, 6 pp.

(345a) Floch briefly discusses two cases of *Leishmania* infection both of which subsequently developed lymphangitis and one, elephantiasis. These could have been wrongly diagnosed as clinical filariasis and he is strongly opposed to those who maintain that all endemic lymphangitis is of filarial origin. S.W.

346—Archives des Maladies de l'Appareil Digestif et des Maladies de la Nutrition.

a. BROIDE, L., 1955.—"Angiocholite hydatique suivie de pyopneumokyste hydatique." **44** (1), 87–89.

b. CAROLI, J., CHAMPEAU, M. & PARAF, A., 1955.—" Traitement médical des kystes hydatiques par la méthode de Cuervo. A propos d'une observation de kyste hydatique du psoas apparemment guéri par les injections de thymol iodé." **44** (2), 186–191.

c. PÉREZ FONTANA, V., 1955.—" Considérations générales sur le traitement du kyste hydatique par le thymol. Méthode de Cuervo, de Salamanque." **44** (2), 191–193.

347—Archives de Muséum d'Histoire Naturelle. Paris.

a. DOLLFUS, R. P. & CHABAUD, A. C., 1955.—" Cinq espèces de nématodes chez un atèle (*Ateles ater* (G. Cuvier 1823)) mort à la ménagerie du Muséum." 7e Série, **3**, 27–40.

(347a) Dollfus & Chabaud collected five species of nematodes from an *Ateles ater*. Of these *Buckleyenterobius atelis* is described and illustrated with the most detail and its relation with *Oxyuronema atelephora* Kreis is discussed. The only valid distinction which the authors have found between these two is that, according to Kreis, *Oxyuronema* is monodelphic and, in their opinion, this material should be re-examined. *Odontorobius* is a synonym of *Buckleyenterobius*. One female *Necator americanus*, one female *Protospirura muricola*, numerous males and females of *Abbreviata caucasica* and four females of *Dipetalonema caudispina* were also collected. S.W.

348—Archivos de Pediatría del Uruguay.

a. ODRIOSOLA, R., 1955.—" Nuevos conceptos de la anquilostomo-necatoriasis en el niño." **26** (2), 243–256.

(348a) Odriosola reviews the symptoms of hookworm infection in children and some of the drugs in use against it. In tests with a series of anthelmintics, Sopper's mixture of carbon tetrachloride and oil of chenopodium, 2:1, at the rate of seven drops per year of age, was found to be the best and to cure 98% of the cases treated. M.McK.

349—Arzneimittel-Forschung. Aulendorf.

a. LÄMMLER, G., 1955.—" Die Chemotherapie der Fasciolose. Zugleich ein Beitrag zur experimentell-chemotherapeutischen Untersuchungsmethodik." **5** (9), 497–502. [English summary p. 502.]

b. GOETERS, W., 1955.—" Die Behandlung der Oxyuriasis mit Terramycin (Oxytetracyclin)." **5** (9), 517–519. [English summary p. 519.]

(349a) Lämmler describes a method of evaluating the effect of a drug on *Fasciola hepatica* in rabbits and guinea-pigs, which is based on the property of drugs to cause necrosis in the flukes from the posterior end forward. The flukes are recovered two days after treatment. The proportion of the fluke body which is necrosed is calculated as an average for all the worms. When expressed as a percentage, this figure serves as a basis for comparison. Lämmler gives an illustrative example: a single dose of 500 mg. per kg. body-weight of hexachlorethane was given to an infected rabbit. Examination of the ten worms recovered two days after treatment showed that the drug had been 66% effective. Seven commercial preparations which contain male fern extract and are used in Germany for the treatment of fascioliasis are listed with their chemical components. M.McK.

(349b) Terramycin not only cured 94·8% of 154 patients suffering from marked *Enterobius* infection, it also inhibited the development of the egg by causing degenerative changes. Nine out of eleven patients in whom piperazine treatment had failed were cured by terramycin. Owing to its high cost the use of terramycin should be limited to those few cases which are resistant to piperazine. R.T.L.

350—Boletín de la Asociación Médica de Puerto Rico.

a. HADDOCK-SUÁREZ, J. & RODRÍGUEZ-MOLINA, R., 1955.—" Schistosomiasis mansoni—the acute phase. Report of a case." **47** (11), 441–449.

351—Boletín del Laboratorio de la Clínica "Luis Razetti". Caracas.

a. PALOMBI, A., 1955.—" Addattamenti biologici dei trematodi digenetici ai fini della conservazione della especie." **16** (45/46), 719, 721, 723–724, 725, 727–730.

(351a) Palombi illustrates by several examples the biological adaptations of digenetic trematodes for the preservation of the species. M.McK.

352—Boletín Médico del Hospital Infantil. Mexico.

a. HERRERA ROMERO, C., TORROELLA, J. M. & GUTIÉRREZ TRUJILLO, G., 1955.—" Uncinariasis en un lactante de 8 meses." **12** (1), 57–60. [English summary p. 60.]

(352a) This is a report on the clinical symptoms shown by a Mexican child, eight months old, with hookworm infection. R.T.L.

353—Boletín de la Oficina Sanitaria Panamericana.

a. GIBSON, C. L., 1955.—" The indiscriminate feeding of anthropophilic *Simulium* upon man and domestic animals, and its relation to studies on the transmission of human onchocerciasis in Guatemala." **38** (3), 293–295. [Spanish summary p. 295.]

(353a) Gibson reports that wild simuliids (*Simulium callidum*, *S. metallicum* and *S. ochraceum*) were collected after they had partially engorged on human volunteers or domestic animals and, after one to two hours, were given an opportunity to bite a different species of animal. Cattle, horses or dogs were used either before or after man: with the exception of *S. ochraceum*, which showed reluctance to resume feeding in combinations in which man alternated with cattle or dogs, the flies readily resumed feeding on the second host. *S. callidum* was not tested with the combination of man and dog. S.W.

354—Botanical Review.

a. DUDDINGTON, C. L., 1955.—" Fungi that attack microscopic animals." **21** (7), 377–439.

(354a) This review contains incidental references to nematodes as the prey of various fungi. Although predacious fungi include members of all classes they are mostly confined to the Zoopagaceae and the hyphomycetes. The former, a family of the Zygomycetes, contains both endozoic and animal-trapping fungi. Of the animal-trapping Zoopagaceae a few of the larger ones capture nematodes by a sticky secretion of the mycelium. The contents of the captured nematode are absorbed through haustoria. The hyphomycetes can be divided into two groups. The *Arthrobotrys* series capture nematodes by sticky hyphal loops or networks, by sticky branches or knobs, or by hyphal rings which may or may not constrict when nematodes enter them. Trophic hyphae grow within the body of the dead captured nematode. The endozoic predacious hyphomycetes have spores which stick to the nematode cuticle. Hyphae grow internally and kill the nematode and later fertile branches grow out and produce conidia. The review deals briefly with a number of aspects including historical outline, systematics, physiology, oecology, economic aspects and technique and gives a bibliography with 131 entries. J.B.G.

355—Brasil-Médico.

a. VERSIANI, O., 1955.—" Mensuração do baço na esquistossomíase." **69** (36/39), 540–542. [Also in English pp. 543–544.]

356—British Sugar Beet Review.

a. JONES, F. G. W., 1955.—" Beet eelworm. Report on a visit to Germany and Holland." **24** (1), 25–28, 39; (2), 77–79.

(356a) In Westphalia where the average rotation is beet or fodder-beet once every seven years there is little trouble due to *Heterodera schachtii*. In the Brunswick area the eelworm is wide-spread, especially on light soils, and losses of 50% or more may occur. A three-course rotation is possible only on the best soils. Where heavy infestations have built up, ten years' rest or more is recommended, including a period under lucerne. Satisfactory crops of beet have been grown on light soil carrying a dangerous infestation by means of irrigation providing 12 inches of water (including rainfall) between April and mid-September. In other areas of Hanover where beet has been grown in alternate years, or swedes included in the rotation, there has been heavy damage to the beet. Trouble is less serious under three to four-course rotations. In the Rhineland province a strict three-course rotation has been proved satisfactory where all crop residues have been ploughed in. In the Rhineland Pfalz eelworm trouble is wide-spread where no set rotations are practised. In south-west Holland on light land where sugar-beet has been grown for 100 years eelworm is serious, while on

heavy soil eelworm populations are low in spite of frequent beet crops. Growers are given advice based on soil sampling. It is suggested that this policy may be sounder than one based on hard and fast rotations and may have to be applied to light land in East Anglia. In England the present policy of encouraging or enforcing crop rotation appears to be preventing serious losses but the eelworm has recently appeared in a number of widely separated places and its further spread is to be expected. M.T.F.

357—Bulletin Agricole du Congo Belge.

a. SCHWETZ, J., 1955.—" Recherches sur la bilharziose des bovidés (*Schistosoma bovis*) dans le Haut-Ituri (Région de Bunia-Irumu)." **46** (6), 1443–1454. [Flemish summary p. 1453.]

(357a) Schwetz examined 13 cattle slaughtered at Bunia and three at Irumu and found eight of the former and all of the latter infected with *Schistosoma bovis*, heavily in some cases. Cercariae emitted by *Physopsis* collected in both localities produced infections of *S. bovis* in mice. S.W.

358—Bulletin of the College of Agriculture, Utsunomiya University.

a. OKADA, T., 1955.—" The seasonal abundance of the root-knot nematode on the carrot." **2** (3), 301–315.

(358a) Observations were made over a period of two years on a population of root-knot nematodes, closely resembling *Meloidogyne hapla*, on carrots. Graphs of population densities of different stages of the nematodes in April-sown carrots showed four peaks during the year from May to April. In carrots sown in April, May or June there were four generations of eelworms per year but in carrots sown in July, August or September the number of generations was uncertain. Numbers of galls found tended to be greater in early-sown than in late-sown carrots. In *Lactuca deblis* there were three generations from May to October but only one from October to April. Hatched larvae were found only when the temperature was above 9·5°C. M.T.F.

359—Bulletin of Entomological Research.

a. LAIRD, M., 1955.—" Notes on the mosquitos of the Gilbert, Ellice and Tokelau Islands, and on filariasis in the latter group." **46** (2), 291–300.
b. SMITH, A., 1955.—" The transmission of bancroftial filariasis on Ukara Island, Tanganyika. I. A geographical and ecological description of the Island with an annotated list of mosquitos and other arthropods of medical importance." **46** (2), 419–436.
c. SMITH, A., 1955.—" The transmission of bancroftial filariasis on Ukara Island, Tanganyika II. The distribution of bancroftial microfilaraemia compared with the distribution of hut-haunting mosquitos and their breeding places." **46** (2), 437–444.
d. SMITH, A., 1955.—" The transmission of bancroftial filariasis on Ukara Island, Tanganyika. III. Biting-incidences on man and filarial infections in wild-caught mosquitos." **46** (3), 495–504.
e. SMITH, A., 1955.—" On the transmission of bancroftial filariasis on Ukara Island, Tanganyika. IV. Host-preferences of mosquitos and the incrimination of *Anopheles gambiae* Giles and *A. funestus* Giles as vectors of bancroftial filariasis." **46** (3), 505–515.

(359a) Laird confirms that *Aëdes* (*Stegomyia*) *polynesiensis* is present in the Tokelau and Ellice Islands. He records *Culex* (*Culex*) *annulirostris* from the Tokelau group, *A.* (*Aëdimorphus*) *vexans nocturnus* and *A.* (*Stegomyia*) *aegypti* from Fanafuti (Ellice Islands) and *C. annulirostris* and *A. vexans nocturnus* from Tarawa (Gilbert Islands). At Nukunono (Tokelau Islands) 97 persons aged from 5 to 78 years were examined for microfilariae; 12 of the 43 men and 5 of the 54 women were positive. S.W.

(359c) Smith found that out of almost 6,000 specimens of night blood taken from the population of Ukara Island, 21% showed microfilariae of *Wuchereria bancrofti*. Infections were found in all the 26 villages studied and the infection rate ranged from 6·6% to 30–40%. Mosquitoes were collected in the huts and *Anopheles gambiae* and *A. funestus* were

the predominant species. The most heavily infected villages were, with one exception, situated near areas which were irrigated for growing rice and the incidence of microfilaraemia appears to be correlated with the density of the populations of *A. funestus* and *A. gambiae*. The blood of a large number of animals was examined for microfilariae; three species of birds, 12 out of 65 Agama lizards, one dog and 16 out of 28 rock-rabbits were found infected. S.W.

(359d) Smith has found that on Ukara Island the incidences of *Anopheles gambiae* and *A. funestus* depend more on the amount of rain falling than on changes in the level of the lake. These two species were by far the commonest biters inside huts between 7 p.m. and 3 a.m. East African Standard Time and were also taken biting outdoors in fair numbers. In a village near a swamp *Taeniorhynchus africanus* and *T. uniformis* were common biters outside but were only found in small numbers biting inside a hut. Observations on the sleeping arrangements show that people between the ages of six and sixteen years are most exposed to biting mosquitoes. Dissection of more than 7,000 mosquitoes revealed developing filariae in the proboscis of *A. gambiae* and *A. funestus*; immature forms were found in the thorax of *A. pharoensis*, *T. africanus*, *T. uniformis* and *Culex attenuatus*. An appendix sets out the incidence of filariae in the four last mentioned species and the seasonal incidence in *A. gambiae* and *A. funestus*; the infections in these two species were heavier near the beginning of the long dry season than in the long wet season. S.W.

(359e) Almost all the mosquitoes resting in huts on Ukara Island are *Anopheles gambiae* and *A. funestus*; precipitin tests showed that they feed almost entirely on man although *A. gambiae* will feed on domestic fowl and a wide variety of small animals. Of the other rarer hut-haunting species *A. pharoensis* feeds more on man than on ox whereas the culicines feed more on ox (and other small animals) than on man. Goats, dogs and domestic fowl which are also present in the huts form little of the diet of blood-feeding mosquitoes. Hand catching confirmed the results of the precipitin tests. The mosquitoes found in natural and artificial outdoor resting places are listed and discussed, and precipitin tests indicated that *A. rhodesiensis* feeds almost entirely on rock-rabbits. Laboratory experiments on the feeding reactions of mosquitoes to small animals in cages are described. It is concluded that on Ukara Island transmission of *Wuchereria bancrofti* is almost wholly by *A. gambiae* and *A. funestus* although *A. pharoensis* may play some part. S.W.

360—Bulletin de l'Institut National pour l'Étude Agronomique du Congo Belge.

a. ANON., 1955.—" La lutte contre quelques ennemis du tabac au Lomami. II. Les nématodes des racines." **4** (4), 267–273.

(360a) In experiments on the control of root-knot nematode in tobacco seed-beds, the following treatments were replicated on plots of 2 sq.m.; (i) 1 kg. urea plus 0·5 kg. calcium cyanamide 72 days before sowing; (ii) thirty-two 3 ml. injections of D-D to a depth of 17·5 cm. 32 days before sowing; (iii) chloropicrin at the same rate and in the same way 20 days before sowing; (iv) a commercial product containing 42% by weight of ethylene dibromide as in (ii) 32 days before sowing; (v) a layer of straw and brushwood 30 cm. thick burnt on the plot 15 days before sowing; (vi) 120 gm. of parathion mixed with fertilizer and applied nine days before sowing; (vii) 20 gm. of parathion in 10 l. of water four times at weekly intervals starting one week after germination; three untreated plots. Number, height and weight of seedlings were recorded at intervals until transplanting and number of nematodes in root samples taken 47, 51 and 58 days after sowing. All treatments except burning resulted in a better stand of seedlings three weeks after sowing. After seven weeks height and weight of seedlings were greater than control in all treatments except parathion. Fewest nematodes were found in samples from plots treated with D-D and by burning but counts were irregular. It is concluded that the most effective treatments were fumigation with D-D, ethylene dibromide and burning. Chloropicrin is considered too costly and parathion too phytotoxic to be recommended. M.T.F.

361—Bulletin de la Société de Pathologie Exotique.

a. SCHWETZ, J., 1955.—" Infection expérimentale des rats de maison (*Rattus rattus*) par divers schistosomes. (Deuxième note.)" **48** (5), 655–658.
b. SCHWETZ, J., BAUMANN, H. & FORT, M., 1955.—" Nouveaux essais de transmission de *Schistosoma mansoni* par *Pl. dufouri* (*Pl. metidjensis* du Portugal) et par *Pl. corneus* (de Bruxelles)." **48** (5), 658–661.
c. MARILL, F. G., 1955.—" Note sur le comportement de *Bullinus contortus* Mich., dans les conditions naturelles, en présence de composés azotés." **48** (5), 661–663.
d. MONTESTRUC, E. & BERDONNEAU, R., 1955.—" L'anguillulose dans les grandes éosinophilies dites 'tropicales' ou encore des 'pays chauds'." **48** (5), 663–668. [Discussion pp. 668–669.]
e. SOUVEINE, G., DODIN, A., GRJEBINE, A. & BRYGOO, E. R., 1955.—" Périodicité des microfilaires sanguines de la côte Est de Madagascar." **48** (5), 669–672.
f. RODHAIN, J., 1955.—" Au sujet de la localisation de *Dipetalonema vanhoofi* chez le chimpanzé E. Peel et M. Chardome." **48** (5), 672–677.
g. KOERBER, R., & LINHARD, J., 1955.—" L'éosinophilie à Dakar. Action de l'A.C.T.H. sur quelques grandes éosinophilies." **48** (5), 714–734.
h. GALLAIS, P., PAILLAS, P., COLLOMB, P., LUIGI, D. M., DEMARCHI, J. & DESCHIENS, R., 1955.—" Étude anatomo-pathologique d'un kyste parasitaire cérébral observé chez l'homme." **48** (6), 830–832.
i. BRYGOO, E. R. & ESCOLIVET, J., 1955.—" Enquête sur la filariose aux Comores, à Mayotte et Mohéli." **48** (6), 833–838.
j. LÉPINE, P., DESCHIENS, R., GAGÉ, M. & VINCENT, J., 1955.—" Présence apparemment insolite et conservation de microfilaires du singe dans les cultures de tissus." **48** (6), 838–843.
k. MANDOUL, R. & AROUA, A., 1955.—" L'ankylostomose en Algérie. La région orientale de la cuvette du Hodna est bien un foyer endémique." **48** (6), 843–847.
l. GRENIER, P., HAMON, J. & RICKENBACH, A., 1955.—" Simuliidae d'Afrique Occidentale française (Haute-Volta, Dahomey, Soudan français, Senégal, Côte d'Ivoire." **48** (6), 885–891.

(361a) Schwetz has demonstrated experimentally that *Rattus rattus* is potentially a good host for *Schistosoma mansoni*, *S. rodhaini*, *S. bovis* and *S. intercalatum* but that it is not so satisfactory for *S. haematobium*. In view, however, of the fact that *R. rattus* is not easily tamed and remains difficult to handle, he does not recommend that it should replace the albino mouse as a laboratory animal. S.W.

(361b) Schwetz *et al.* have tested the ability of three strains of *Schistosoma mansoni* to infect *Planorbis dufouri* and *P. corneus*. All infected *P. dufouri*, none *P. corneus*. They discuss the possible significance of this as *P. corneus* is anatomically very closely related to *P. dufouri*. S.W.

(361c) Since 1947 Marill has examined periodically a stream into which flows the sewage outfall from a village which is a focus of urinary schistosomiasis. The molluscs found were *Bulinus contortus*, *Physa acuta* and *Planorbis metidjensis*. The nitrogen present as nitrate, nitrite or ammonia was investigated and varied from nil to 8 mg. per thousand, nil to 0·5 mg. per thousand and 1 mg. to 5·5 mg. per thousand respectively. *B. contortus* was the least affected by the nitrogen concentration but concentrations up to the limit tolerable in drinking water do not appear to affect the molluscs adversely. S.W.

(361d) Montestruc & Berdonneau discuss the term "tropical eosinophilia" and are of the opinion that this syndrome is almost always of parasitic origin. They describe seven cases in white and seven in coloured persons, all of whom were shown by faecal culture, repeated several times in some cases before positive results were obtained, to be infected with *Strongyloides stercoralis*. In the cases which they describe there did not appear to be any racial difference in the production of hypereosinophilia, contrary to observations made by other workers. A case of genuine non-parasitic tropical eosinophilia is described in an addendum. In the discussion, Deschiens points out that although there is a definite difference in the eosinophilic reactions of white and coloured people, *S. stercoralis* is a notably eosinophilogenic parasite and that infection with it would cause hypereosinophilia in both races. S.W.

(361e) The authors made two-hourly examinations of the blood of four persons infected with *Wuchereria bancrofti* var. *vauceli* in Madagascar. They found that the maximum numbers of microfilariae were present in the blood between 8.30 p.m. and 6.30 a.m. S.W.

(361f) Rodhain has not been able to confirm Rousselot's observation [for abstract see Helm. Abs., **24**, No. 85f] that the blood vessels of the liver are the normal habitat for adult *Dipetalonema vanhoofi* although they are localized within the liver. Sections of the liver of two out of three chimpanzees which had shown microfilariae in the peripheral blood revealed the presence of the macrofilariae, but they appeared to be in the loose connective tissue around the afferent blood vessels of the liver or, in some cases, in lymph spaces. S.W.

(361g) Koerber & Linhard have investigated eosinophilia in 1,000 Europeans and 448 Africans (one group of 100 and the other of 348) in Dakar. Amongst the Europeans, 30% showed an eosinophilia of more than 5%, 10% of more than 10% and 1·2% of more than 25%. In the two groups of Africans, the percentages showing an eosinophilia of more than 5%, 10% and 25% respectively were: 58% and 70%; 48% and 40%; 4% and 3·5%. The differences in the percentages of eosinophilia amongst the Europeans and the Africans correspond closely to the differences in the numbers of those infected with helminths, namely 9·88% in Europeans and 25% in Africans. They describe a number of cases in detail and tabulate the results of Thorn tests which, in those with an eosinophilia of more than 25%, gave variable results. In all but one of the cases where the investigations could be repeated evidence of previous or present infection with parasites was found. S.W.

(361h) Gallais and his collaborators found an adult trematode in a cerebral cyst removed from a man who was suffering from epileptiform seizures. The size of the parasite and size and appearance of the eggs indicated that it was a *Heterophyes*. An axillary cyst had been previously removed and this also contained helminth eggs. This is, as far as the authors know, the first record of an adult trematode in a cerebral cyst in man. Four photomicrographs illustrate the paper. S.W

(361i) Brygoo & Escolivet have made a survey of filariasis in Mayotte and Moheli, two of the Comoro Islands. In Mayotte 736 women and 702 men were examined and typical microfilariae of *Wuchereria bancrofti* were found in the peripheral blood of 197 and 339 respectively. In Moheli 356 out of 936 women and 517 out of 1,060 men were similarly infected. In both islands the infection rate increased with age and elephantiasis of the lower limbs was common occurring in 0·8% of the total population of Mayotte and 1·7% of that of Moheli. A list of mosquitoes found in the islands, which the authors state is incomplete and contains only those species which were most common at the time of their visit at the end of June 1955, includes *Anopheles gambiae* and *A. funestus*, both known vectors of *W. bancrofti* in Africa. They consider that Moheli would be particularly suitable for a large scale experiment in the eradication of the disease. S.W.

(361j) Lépine *et al.* report the presence and prolonged survival of two types of microfilariae in cultures of renal tissue of *Papio sphinx*. The microfilariae survive the processes of preparation of the culture which include reducing the kidney tissue to a fine pulp, treatment with trypsin, centrifuging, keeping at 0°C. for several hours and dilution with a synthetic medium. A large number of monkeys are used in this way and the infection rate is not more than 10%, although 50% of certain batches of monkeys have produced cultures contaminated with microfilariae. Examination of the blood does not always reveal the infection. The small microfilariae are identified as *Dipetalonema vanhoofi*; the larger are of *Loa* type and may possibly be those of *L. papionis* (for which *Paraloa* may subsequently be substituted). Three photomicrographs illustrate the paper. S.W.

362—Bulletin de la Société des Sciences et des Lettres de Łódź. Classe III de Sciences Mathématiques et Naturelles.

a. PAWŁOWSKI, L. K., 1955.—" Révision des genres *Erpobdella* de Blainville et *Dina* R. Blanchard (Hirudinea)." **6** (3), 1–15.
b. PAWŁOWSKI, L. K., 1955.—" Observations biologiques sur les sangsues." **6** (5), 1–23.

(362a) The leeches hitherto placed in the genus *Erpobdella* de Blainville are allocated to three subgenera of which two are new, viz., (i) *Erpobdella* n.subg. type *Erpobdella* (*E.*) *octoculata*, *E. monostriata*, *E. nigricollis*, *E. punctata* and *E. testacea*; (ii) *Dina* Harant, 1929, type *Erpobdella* (*Dina*) *lineata* (O. F. Müller); (iii) *Mooreobdella* n.subg. type *Erpobdella* (*Mooreobdella*) *fervida* (Verrill), *E.* (*M.*) *microstoma* (Moore, 1901). R.T.L.

(362b) A series of observations on the nutrition, hibernation and reproduction of leeches are recorded. R.T.L.

363—California Agriculture.

a. LEAR, B., & JACOB, F. C., 1955.—"Electrical tests on nematodes. Results of investigations with high-voltage, nonthermal electrical treatments for control of root-knot nematodes." **9** (10), 9, 14.

(363a) Details are given of experiments in which samples of about 6·2 cubic inches of soil infested with eggs and larvae of *Meloidogyne incognita* var. *acrita* were treated electrically and then placed in pots in which tomato seedlings were grown for five weeks. There was no apparent effect of the treatment on the nematodes as judged by the production of galls on the tomato roots. It is concluded that high-voltage, non-thermal electrical soil treatments are impractical. M.T.F.

364—Canadian Journal of Biochemistry and Physiology.

a. PASSEY, R. F. & FAIRBAIRN, D., 1955.—" The respiration of *Ascaris lumbricoides* eggs." **33** (6), 1033–1046.

(364a) Passey & Fairbairn showed that the rate of oxygen consumption of "decoated" eggs of *Ascaris lumbricoides* fell during the first one-and-a-half days of development at 30°C. and then rose to a maximum of about 0·8 μl. per mg. dry weight per hour after 10 days. Thereafter, although the eggs remained viable the rate fell until oxygen uptake was scarcely measurable after 140 days. Respiration was inhibited by cyanide and azide. Carbon monoxide inhibited strongly in the dark but not in the light. The Qo_2 fell rapidly when the Po_2 was reduced below about 80 mm. of mercury. However, cytochrome *c* and cytochrome oxidase could not be detected in the eggs. W.P.R.

365—Canadian Journal of Public Health.

*a. SIEMENS, H., 1955.—" Community treatment for pinworms." **46** (5), 203–204.

366—Central African Journal of Medicine.

a. ALVES, W., WOODS, R. W. & GELFAND, M., 1955.—" The distribution of Bilharzia ova in the male genital tract." **1** (4), 166–167.

(366a) The distribution of schistosome eggs in the male genital tract of 50 patients autopsied at Salisbury, Rhodesia, showed that the eggs are far more likely to be deposited in the genital structures close to the bladder than in those far from it. Of the 36 subjects with *Schistosoma haematobium* infection of the bladder, 26 had eggs in the rectum, 29 in the seminal

vesicles, nine in the vas deferens, nine in the prostate and two in the tunica vaginalis. Of nine with *S. mansoni* infection of the rectum, two had eggs in the seminal vesicles and one in the bladder. M.MCK.

367—Chinese Medical Journal.

a. LU, C. C., CHUNG, H. L., LING, C. C., WANG, C. C., CHIANG, Y. T. & HSÜ, W. F., 1955.—" Some aspects of research in the prevention and treatment of schistosomiasis japonica in New China." **73** (2), 100–106.

b. FENG, L. C., TUNG, M. S. & SU, S. C., 1955.—" Two Chinese cases of *Gongylonema* infection. A morphological study of the parasite and clinical study of the cases." **73** (2), 149–162.

(367a) In the campaign against schistosomiasis japonica in the region of the Yangtze Valley, 17 stations, 61 substations and 132 field units have been established in recent years and 3,000 health personnel have been trained. Of 55,355 cases treated in 1953, 60% were restored to health and the general condition of the others was improved. In addition a health education campaign was carried on. Research into methods of prevention included those for destroying schistosome eggs. One part of stool to five parts of undiluted urine can safely be used as a fertilizer after storage for three days in summer and one week in winter. Paris green and calcium arsenate proved destructive of the vector *Oncomelania* but copper sulphate had no marked lethal effect. Croton oil emulsion, sprayed at the rate of 1% per square metre, killed 90% of *Oncomelania*. Boiling water and burning the grass were effective to some extent. Penetration by cercariae through animal skin could be prevented by applying various mixtures containing tung oil. The cow, water-buffalo, horse, pig, dog, cat, rat and field-mouse are reservoir hosts but the water-buffalo is the most important as it is the chief domestic animal. In one district schistosome eggs were found in the faeces of 12% to 13% of the pigs. Of native herb medicines Platycodon, Piper, Gleditschia, Chrysanthemum and Stephania were lethal to schistosomes in varying degree. White mice became infected when in contact with water droplets on blades of grass from a plot on which there were naturally infected *Oncomelania*. Over 90% of patients with *Schistosoma japonicum* reacted to cercarial antigen and 75% to adult worm antigen. Repeated infections of white mice with small divided doses of schistosome cercariae produced partial immunity to reinfection. R.T.L.

(367b) Two nematodes removed from the tongues of two Chinese patients, one from Hunan and the other from Honan, proved to be males of *Gongylonema pulchrum*, a common parasite in the oesophageal wall of cattle in Peking. This is the first occasion on which the male worms have been found in man. Examination of the mucosa of the oesophagus of one of the cases showed patches of erosion and spots oozing blood. Biopsy at these lesions gave typical *Gongylonema* eggs. These were also present in the blood emitted from the mouth. R.T.L.

368—Comptes Rendus des Séances de l'Académie des Sciences. Paris.

a. TIMON-DAVID, J., 1955.—" Développement expérimental d'un trématode du genre *Urotocus* Looss 1899 (Digena, Leucochloridiidae)." **241** (25), 2014–2015.

(368a) Timon-David has completed experimentally the life-cycle of *Urotocus tholonetensis*. *Helicella arenosa*, which is frequently eaten by magpies, is the intermediate host. The sporocyst, 45 days after infection of the snail, is a mass of ramifying branches containing germinal masses and developing cercariae and closely resembles that of *Leucochloridium paradoxum*, except that all the branches remain white. After 67 days the characters of the cercariae within the sporocyst are well differentiated; they measure about 423 μ in length, are tail-less and the anterior region is strongly retracted; the caeca extend to within about 50 μ of the posterior end, the excretory system is Y-shaped and the glandular masses on each side are well developed. S.W.

369—Comptes Rendus des Séances de la Société de Biologie. Paris.

a. FRAGA DE AZEVEDO, J. & COSTA FARO, M. M. DA, 1955.—" Différence dans la susceptibilité de quelques espèces de *Planorbis* à l'infection par le *Schistosoma mansoni* de Mozambique." **149** (19/20), 1848–1851.

b. SCHWETZ, J., FORT, M. & BAUMANN, H., 1955.—" Sur le problème d'une infection uni- ou bisexuée transmise par les cercaires de *Schistosoma* émises par un seul mollusque." **149** (21/22), 2026–2028.

(369a) Fraga de Azevedo & Costa Faro exposed 136 *Australorbis glabratus olivaceus* from Brazil, and 90 *Biomphalaria pfeifferi*, 274 *Planorbis dufouri* and 50 *Helisoma duryi* from Mozambique to *Schistosoma mansoni* miracidia. The miracidia were obtained from a monkey which had been infected experimentally with the strain of *S. mansoni* occurring in the same area of Mozambique from which the snails had been collected. Only *B. pfeifferi* was susceptible to infection. In the authors' experiments, the results of which are tabulated, age had no effect upon susceptibility. S.W.

(369b) Schwetz *et al.* have shown that cercariae of *Schistosoma mansoni* or of *S. rodhaini* emitted from a single planorbid, naturally or experimentally infected with an unknown number of miracidia, are capable of giving rise to unisexual or bisexual infections in mice There is, however, a tendency towards unisexual male infections. S.W.

370—Cornell Veterinarian.

a. WHITLOCK, J. H., 1955.—" The evaluation of pathological growth and parasitic disease." **45** (3), 411–422.

b. WHITLOCK, J. H., 1955.—" A study of the inheritance of resistance to trichostrongylidosis in sheep." **45** (3), 422–439.

c. JENSEN, P., MAPES, C. R. & WHITLOCK, J. H., 1955.—" Pasture management and control of the lancet fluke (*Dicrocoelium dendriticum* Rudolphi, 1819)." **45** (4), 526–538.

(370a) Whitlock discusses the difficulties of analysing data from sick animals. Working with naturally acquired trichostrongylid infections in lambs the challenge (evaluated by faecal egg counts) and the response (evaluated by change in haematocrit) were related. The square root of the egg count was first plotted against the net loss in haematocrit and this showed that one ram produced highly resistant offspring. A further transformation for the egg counts was used in which the logarithm of the net loss of haemoglobin was plotted against the square root of the egg counts; this appeared to control the variance and demonstrated clearly that the differences in resistance between the offspring of the different rams was not due to chance. Analysis of untransformed data is risky as a valid experiment may appear non-significant or significance may appear where it does not exist. S.W.

(370b) Whitlock has studied the resistance of lambs of known parentage to trichostrongylid infections acquired naturally from pasture. From statistical analysis of the results as shown by growth rate, weight gain, faecal egg counts and haematocrit values it is evident that part of the complexity of the disease is due to genetic factors. Within the time limits of the experiment trichostrongylidosis induced either a depression or, in some cases, an acceleration of growth. Progeny from one ram showed marked resistance and the existence of a genetic effect was well demonstrated. There was some evidence that inherited resistance can be transmitted by the ewe. The elimination of sires of susceptible progeny is suggested as an aid to controlling the disease. An appendix shows the covariance analysis of transformed data. S.W.

(370c) In the life-cycle of *Dicrocoelium dendriticum* two intermediate hosts, the land snail, *Cionella lubrica*, and the ant, *Formica fusca*, are involved. The number of the definitive hosts of this parasite renders anthelmintic control difficult. As Krull & Mapes have shown that *C. lubrica* is incapable of returning to the surface when covered by an inch of soil, the ploughing in of the molluscan vector seemed a simple and logical method of control. Various experiments are described and statistically analysed which indicate that destruction of the

grass harbouring the snails by the application of TCA had no significant effect on the snail population but that the number of snails can be reduced by ploughing, and that a combination of ploughing and reseeding, which from the farmer's point of view would be a superior method of pasture management, is equally effective. R.T.L.

371—Countryman. Nicosia.

a. ORHAN, A., 1955.—" Parasitic gastro-enteritis in sheep and goats." **9** (12), 14.

(371a) Pointing out that several outbreaks of parasitic gastro-enteritis have occurred in Cyprus, Orhan describes the symptoms and prevention of the disease and urges immediate drenching with copper sulphate (alone or with nicotine) or phenothiazine. M.McK.

372—Current Science. Bangalore.

a. NEELAKANTAIYA, K. H., 1955.—" Chromosomes in oogenesis of *Ascaris vitulorum*." [Correspondence.] **24** (9), 308.
b. MOHIYUDDEEN, S., 1955.—" Cerebrospinal nematodiasis among bovines in some malnad tracts of Mysore State." [Correspondence.] **24** (10), 340–341.
c. SIDDIQUI, Q., 1955.—" Gall formation in the roots of *Eclipta alba* Linn." [Correspondence.] **24** (12), 424–425.

(372a) Neelakantaiya has observed fertilization in *Neoascaris vitulorum*. The meiotic divisions of the primary oocyte nucleus do not take place until after the oocyte has been penetrated by a spermatozoon. Two polar bodies are extruded and there are nine bivalent chromosomes visible at metaphase. The male nucleus enlarges and becomes irregular in outline during the second meiotic division. Multipolar spindles were quite common in the first reduction division and these nuclei apparently degenerate. S.W.

(372b) In cattle in Mysore State a non-febrile paraplegia occurs in acute, subacute and chronic forms. Microscopical examination of the brain and spinal cord from four typical cases revealed the presence of sheathed nematode larvae and lesions of focal liquefactive encephalomyelomalacia. Immature nematodes as well as microfilariae were also seen in sections of the spinal cord. This is stated to be the first time that the disease has been recognized as cerebrospinal nematodiasis among bovines. R.T.L.

(372c) A description is given of galls caused by root-knot nematodes in *Eclipta alba* L. and the histological changes involved. *Lippia nodiflora* is also a host. M.T.F.

373—Deutsche Landwirtschaft.

a. ROTERS, 1955.—" Das Nematodenproblem muss beachtet werden!" **6** (2), 95–96.
b. REINMUTH, E., 1955.—" Zur Biologie und Ökologie des Kartoffelnematoden sowie Grundsätzliches zu seiner Bekämpfung." **6** (7), 336–341.

(373a) Roters reports a lecture given by Hey in which he briefly describes the damage done by the more important plant-parasitic nematodes and some of the measures for control. M.T.F.

(373b) After short accounts of the various nematode parasites known to attack potatoes, Reinmuth deals with "enemy No. 1", *Heterodera rostochiensis*. He reviews some of the biological aspects which point to means of control such as the effects of temperature on larval hatch and on growth of potato plants and the results of these effects on the cyst population in the soil and on disease of the crop. He finds that a lower nematode infestation in the soil leads to a higher rate of attack as shown by the coefficient of increase of the nematodes, and he considers it incorrect to assume that potato-root nematode has only one generation a year. Other factors mentioned which affect the nematode population are fungus, nematode and

protozoan parasites, but these do not effect any appreciable control. The development of resistant varieties of potato, the cultivation of "enemy plants" and crop rotations should all be encouraged as means of combating potato-root eelworm. M.T.F.

374—Deutsche Medizinische Wochenschrift.

*a. VOGEL, H., 1955.—" Über den Entwicklungszyklus und die Artzugehörigkeit des europäischen Alveolarechinococcus." **80** (24), 931–932.

b. BERGSTERMANN, H. & BOGNER, K., 1955.—" Piperazin-Zitrat zur Behandlung der Oxyuriasis." **80** (35), 1260–1261.

(374a) Following on the discovery by Rausch & Schiller [for abstracts see Helm. Abs., **19**, No. 337bx, **23**, No. 432c] of alveolar echinococcosis in microtine rodents and the adult form in foxes, Vogel has found similar infections in the livers of field-mice and mature *Echinococcus* segments in the faeces of red foxes around Alpine villages, where human cases of alveolar echinococcosis have recently occurred. Mature segments fed to a sheep, two guinea-pigs and two hamsters gave no result but when fed to three *Microtus arvalis*, two *Microtus oeconomus ratticeps*, one *Sigmodon hispidus* and four white rats, cysts were present in the livers one to five months afterwards. The liver of a naturally infected field-mouse, from an area in which there were naturally infected foxes, was fed to a dog. Fifty-five days later about 1,000 adult echinococci were collected from its intestine. These specimens and those obtained from the local foxes were morphologically identical; but differed from *Echinococcus granulosus* in (i) length, 1·4 to 3·4 mm., (ii) position of the genital pore in front of the middle of the proglottis, (iii) number of testes, 21–29, (iv) absence of lateral uterine branches. The adults were identical with those obtained by Rosselt after feeding a dog with an alveolar cyst from a human case in the Tyrol in 1901. On grounds of priority the specific name of the *Echinococcus* producing an alveolar cyst should be *Echinococcus multilocularis* Leuckart, 1863. Its identity with *E. sibiricensis* Rausch & Schiller is probable. European human infection with alveolar echinococcosis probably results from contamination of the hands with earth or vegetable material soiled by fox faeces or from handling fox skins. R.T.L.

(374b) Bergstermann & Bogner found that 80% to 85% of children in Munich orphanages were positive for Enterobius. A group of the children were given piperazine citrate in the form of Tasnon, a pleasant tasting syrup which was readily taken and caused no side effects. The dosage was one teaspoonful three times a day (i.e. 2·4 gm. piperazine citrate per day) for one week. Immediately before treatment 66 of 86 children were positive; three days after treatment only 13 remained positive. A.E.F.

375—Dokladi Akademii Nauk SSSR.

a. MARKOV, G. S., 1955.—[Interspecific relationships in helminths coexisting in the lungs of grass frogs.] **100** (6), 1203–1205. [In Russian.]

(375a) The influence of *Rhabdias bufonis* infections on *Haplometra cylindracea* populations, the only two helminths found in the lungs of *Rana temporaria* from the Leningrad vicinity, was observed on 215 adult frogs with worms in both lungs. In the lungs without *R. bufonis* the average number of *H. cylindracea* per lung was 0·45, in those with 1 to 10 nematodes it was 0·15, with 11 to 15 it was 0·07, and with 16 to 20 it was 0·03. Thus 93·5% of the trematodes were found in lungs with not more than ten *R. bufonis*. The interspecific influence was observed for different localities and seasons. The degree of *Haplometra* infection was the same for male and female frogs, but in females 27·4% of the lungs were free from *R. bufonis* and these contained 80·6% of the total trematode population for the female hosts. The respective values for males were 10% and 20%. The lungs with one to ten nematodes, which comprised 50% to 60% of the lungs in both sexes, contained 13% of the trematode population in the females and 73·4% in the males. These results are explained by a combination of a greater resistance of the females to *R. bufonis* and the interspecific influences. G.I.P.

376—East African Medical Journal.

a. NEVILL, L., 1955.—" A preliminary trial of the use of banocide as a prophylactic against filarial fever." **32** (8), 337–340.

(376a) Nevill reports an experiment carried out in a Kenya village in an area where filariasis bancrofti is endemic. Banocide, given either daily or twice weekly, appeared to cure the filarial fever and to eliminate microfilariae from the blood although the microfilariae also disappeared from the blood of those given calcium tablets as controls. There were no toxic or anaphylactic reactions. After spraying the houses with 5% D.D.T., a number of mosquitoes were caught which were identified as *T.* [*Taeniorhynchus*] *africanus* and *T. uniformis*. S.W.

377—FAO Plant Protection Bulletin. Rome.

a. GRAM, E., 1955.—" Survey of potato root eelworm in Denmark." **3** (12), 179–182.

(377a) In a survey of seed-potato fields in Denmark during 1951–54 potato-root eelworm was rarely found and over one quarter of the infested samples contained only one cyst. All gardens and potato fields in 11 parishes were surveyed in 1952 and 11 others in 1953: 14 were free, six slightly infested and only one village and one small area were badly infested. In a small town, Ribe, all gardens and potato fields were sampled up to a distance of one mile outside the town. Here 95 of 1,200 samples were infested and the infestation appeared to have spread from the town to allotments along the main roads. Of 2,966 samples taken in 1953 and 1954 from nurseries only two contained cysts while four samples were infested out of 954 from gardeners and small-holders producing vegetables and bedding-out plants. Legislation forbids the growing of potatoes and the movement of potatoes, plants with adhering soil or other possible carriers of cysts from holdings known to be infested. M.T.F.

378—Fukuoka Acta Medica.

a. NAGAO, M., 1955.—[A case of creeping disease caused in man by a larval *Gnathostoma spinigerum*.] **46** (11), 207–214. [In Japanese: English summary pp. 207–208.]

b. MIYAZAKI, I., 1955.—[Morphological studies on some species of *Gnathostoma* occurring in foreign lands.] **46** (12), 6–12. [In Japanese: English summary pp. 6–7.]

(378a) Although gnathostomiasis is now reckoned among the most important parasitic diseases in Japan the number of cases in which the worm has actually been discovered number so far only seven. An eighth case is now reported from Fukuoka-ken. The migration of the parasite in the skin caused intermittent oedema and the advancing margin of the eruption was bright red in colour changing to a light yellowish brown in the rear. There was an eosinophilia of 20% in the early stage. This soon reverted to normal after the worm had been removed. R.T.L.

(378b) Miyazaki briefly describes the larvae of *Gnathostoma spinigerum* obtained from Thailand and notes the presence of many rows of minute spines on the posterior extremity. He compares the adults of *G. spinigerum* and *G. hispidum* from China and illustrates the body spines of *G. spinigerum* and *G. procyonis* obtained from a raccoon in Texas. R.T.L.

379—Gastroenterology. Baltimore.

a. DESCHAMPS, S. H., REDMOND, J. L. & DeLEEUW, H., 1955.—" Hepatic granulomas in schistosomiasis." **28** (6), 990–1015.

(379a) The hepatic granulomata in cases of schistosomiasis are morphologically identical with those found in sarcoidosis, brucellosis, tuberculosis, mycosis etc., except that each contains a normal or calcified egg-shell or chitinous material. The cause of pipe-stem cirrhosis in schistosomiasis is discussed and is thought to be the end result of long continued deposition of schistosome eggs in the portal areas. R.T.L.

380—Harefuah.

a. DAVIES, A. M., 1955.—[Preliminary account of an outbreak of Bilharzia in the Beth-Shean Valley.] **49** (1), 9–11. [In Hebrew: English & French summaries pp. 10–11.]

(380a) *Schistosoma haematobium* was found in 97 (21·5%) of the inhabitants of Kibbutz Tirat-Zvi, in Israel. The infections were mild, were nearly all in people under 20 years of age and had almost certainly been acquired in local bathing pools and from nearby Iraqi and Iranian settlers. Surveys in the area suggested that other foci exist in the Beth-Shean Valley, where snail eradication is urgent. M.McK.

381—Hemera Zoa. Buitenzorg.

a. TANDJUNG ADIWINATA, R., 1955.—" Tjatjing[2] jang berparasit pada hewan menjusui dan unggas di Indonesia." **62** (9/12), 229–247. [English, French & German summaries p. 247.]
b. HOLZ, J., 1955.—" *Raillietina* sp. als Parasit des 'Fliegende Hundes' (=Kalong=*Pteropus celaeno* Herm.)." **62** (9/12), 310–313. [English summary p. 313.]

(381a) The parasitic worms recorded for birds and mammals in Indonesia are listed under forty host species. G.I.P.

(381b) Holz describes *Raillietina* sp. from the small intestine of *Pteropus celaeno* in Java. The proglottides are joined in sections of 22 to 25 segments. The species is very similar to *R. volzi* and *R. pintneri* from birds and he supposes that at some stage a change of the cestode from its bird host to the mammal may have taken place accompanied by a change in the morphology of the parasite. G.I.P.

382—Igiene e Sanità Pubblica.

a. CASSELLA, A., 1955.—" Contributo alla conoscenza delle parassitosi intestinali e, in particolare, dell'anchilostomiasi in provincia di Salerno." **11** (1/2), 60–70. [English, French & German summaries pp. 60–61.]

(382a) The examination of faeces from 2,887 land workers in the province of Salerno in Italy showed helminth infections in just over 41% and *Ancylostoma* in 19·7%. M.McK.

383—Indian Journal of Medical Research.

a. SHAH, S. N. & GADGIL, R. K., 1955.—" Human schistosomiasis in India. Part I. The study of snails." **43** (4), 689–694.
b. GADGIL, R. K. & SHAH, S. N., 1955.—" Human schistosomiasis in India. Part II. Infection of snails with *Schistosoma hematobium*." **43** (4), 695–701.
c. SHAH, S. N. & GADGIL, R. K., 1955.—" Human schistosomiasis in India. Part III. Note on the clinical survey of the endemic focus." **43** (4), 703–706.

(383a) Shah & Gadgil studied the snail fauna in the locality of an endemic focus of schistosomiasis haematobia in India. The types of snails found in the locality were *Paludomus obesa*, *Ferrissia tenuis* and shells of *Indoplanorbis exustus*. Attempts were made to culture the first two in the laboratory. Only when aerated could *F. tenuis* be induced to breed and although the activity of *P. obesa* was high they showed no signs of breeding. Details are given of the characteristics of the snails and the oecology of the laboratory aquaria is fully described. D.L.H.R.

(383b) Gadgil & Shah made a study of the natural infection of the snails in the locality of an endemic focus of schistosomiasis in India; they also attempted the experimental infection of these and other snails in the laboratory with *Schistosoma haematobium*. Wild and laboratory-bred *Planorbis helisoma*, *P. torquis*, *Limnaea luteola*, *Ferrissia tenuis*, and wild *Paludomus obesa* were exposed to infection and with the exception of *F. tenuis* were found to be refractory. It is thought that *F. tenuis* is the intermediate host. D.L.H.R.

(383c) Shah & Gadgil made a clinical survey of the endemic focus of schistosomiasis in India. The maximum number of cases was found in the group under ten years of age with

a gradual fall in incidence of the disease in the higher age groups which can be explained on the basis of the inability to obtain a proper past history from the inhabitants. Almost all cases up to the age of 20 years had active symptoms of the disease while the majority of the cases in the age group 21 to 30 years gave only past history of the disease. The oldest patient, 85 years of age, gave definite history of having suffered from the disease during childhood. The chief symptom of the disease was haematuria. Itching and urticaria were absent at the time of cercarial entry into the skin. Cystoscopic examination showed diffuse ulceration of the mucous membrane of the bladder. Eosinophilia ranging from 10% to 20% was found in a number of cases but this could not be attributed to *Schistosoma haematobium* infection owing to the presence of heavy nematode infection. Patients brought to Bombay were treated with Fantorin. D.L.H.R.

384—Indian Journal of Medical Sciences.

a. VORA, D. D., 1955.—" A clinical study on specificity of the anthelmintic action of oxygen against *Ascaris lumbricoides*." **9** (5), 217–219.

(384a) Each of 20 patients passing Ascaris ova received 1,000 c.c. of air (as an inert gas) administered into the stomach. One other patient tolerated only 700 c.c. Three eliminated ascarids and two others ceased to pass eggs. Three or more days later seven of the remaining cases were given 1,000 c.c. of oxygen into the stomach and three eliminated ascarids. It is concluded that oxygen does not act as an inert gas but has a specific action. M.MCK.

385—Indian Journal of Veterinary Science and Animal Husbandry.

a. PETER, C. T., 1955.—" Studies on the cercarial fauna in Madras. III. A new species of xiphidio-cercaria." **25** (4), 335–339.

(385a) Five species of xiphidiocercariae were found in molluscs in the City of Madras. One from *Limnaea luteola* f. *australis* is named *Cercaria ramanujami* n.sp. It belongs to the *Conniae* division of the *Polyadena* group. As the base of the stylet is not reinforced it resembles that of *C. conniae* and *C. aalbui* but differs from them as the length of the gut reaches the acetabulum and behind lies the genital primordium as an undifferentiated cluster of cells. There are no caudal pockets or sinuses containing setae. The penetration glands are composed of eight cell units in each. Cercarial development takes place in pigmented elongate sporocysts. R.T.L.

386—Japanese Journal of Ecology.

a. ICHINOHE, M., 1955.—[Survey on the 'yellow dwarf' disease of soy bean plant caused by *Heterodera glycines* occurring in the peat soil in Hokkaido.] **5** (1), 23–26. [In Japanese: English summary p. 23.]

(386a) "Yellow dwarf" disease of soya beans due to *Heterodera glycines* has been commonly found in volcanic ash soil in Hokkaido. In 1954 it was found in three patches in a field of peat soil where it was thought that the nematodes had increased in a clayey loam rich in humus with which the peat soil had been mulched. M.T.F.

387—Japanese Journal of Medical Science and Biology.

a. ITO, J., 1955.—" Studies on hatchability of *Schistosoma japonicum* eggs in several external environmental conditions." 8 (2), 175–184.
b. YASURAOKA, K., 1955.—" The behavior of *Oncomelania nosophora*, the intermediate host of *Schistosoma japonicum*, to gravity in water." 8 (4/5), 313–321.
c. YASURAOKA, K., 1955.—" The behavior of *Oncomelania nosophora*, the intermediate host of *Schistosoma japonicum*, to light in water." 8 (4/5), 323–329.
d. YANAGISAWA, T., 1955.—" On the structure and formation process of the egg-shell of Ascaris ova." 8 (4/5), 379–390.

(387a) Ito has shown that eggs of *Schistosoma japonicum*, obtained from experimentally infected rabbits, will not hatch at a temperature below 3°C. or above 33°C.; there is a wide

range of optimal temperature, maximum hatching occurrring at temperatures between 13°C. and 28°C. All eggs were killed by exposure to 60°C. for one second, 55°C. for three minutes, −20°C. for 30 minutes, 50°C. for one hour, −10°C. for four hours, 45°C. for eight hours and 38°C. for 19 days. In 0·2% sodium chloride solution eggs hatched normally but in 1% solution only about 2% of the eggs hatched and 4% solution killed all the eggs. Eggs kept in dry faeces at 28°C. for three days would not hatch but in wet faeces they survived 20 days at 28°C. and, in a few instances, 113 days at 18°C. and 180 days at 8°C. In human, rabbit or cow urine eggs did not hatch after one to three days at 28°C. but the survival time increased at lower temperatures. S.W.

(387b) If specimens of *Oncomelania nosophora* are placed in water an initial negative geotaxis occurs when the angle of inclination reaches 7°. Their upward locomotion steadily increases as the angle of the creeping plane is made larger. No significant correlation was observed between the velocity of geotactic locomotion and the angle of inclination. R.T.L.

(387c) In water the reaction of *Oncomelania nosophora* to light is a klinotaxis or tropotaxis. With a sudden decrease in light intensity they show a shadow reaction and the aggregation of the snails to light is considered to be the result of this reaction. R.T.L.

(387d) Yanagisawa concludes, from a study of the effects of treatment with acids and alkalies on the egg-shell of *Ascaris suilla*, that the shell and the vitelline membrane are derived from the oocyte. The first or outermost layer, which consists of two membranes, is formed from unfertilized oocytes and is lifted by a substance secreted by the oocytes of which the second layer is composed. The third layer is formed by ejecting the granules of the ectoplasm. The first polar body is buried between the third layer and the vitelline membrane and is seen optically as the so-called "pitlet" on the shell. R.T.L.

388—Jornal da Sociedade das Ciências Médicas de Lisboa.

*a. GRANATE, J., 1955.—" Tratamento cirúrgico de um caso de hidatidose dos pulmões e do fígado." **119** (1), 30–40.

389—Journal of the Australian Institute of Agricultural Science.

a. COLBRAN, R. C., 1955.—" A preliminary survey of plant nematodes in Queensland." **21** (3), 167–169.

(389a) The most important plant-parasitic nematodes in Queensland are species of *Meloidogyne*, the commonest being *M. javanica*, *M. incognita* and *M. incognita* var. *acrita*. Investigations indicate that some races show discrepancies from the usual host ranges. Of the root lesion nematodes, *Pratylenchus coffeae* causes difficulties in replanted apple orchards and has been observed to reproduce in the roots of over 20 plants, all of them new host records for this species. *P. zeae* is associated with decline of peach trees and has been found in lesions on sugar-cane roots. Other nematodes recorded are *Tylenchulus semi-penetrans* (on citrus and olive), *Radopholus similis* (responsible for banana root rot and on roots of *Musa banksii*), *Rotylenchus erythrinae*, *R. multicinctus* (in lesions on banana roots), *Paratylenchus macrophallus*, *Xiphinema americanum*, *X. campinense*, *Criconemoides lobatum*, *Trichodorus* sp. and all stages of *Tylenchus costatus* and *Aphelenchoides bicaudatus* in the root cortex of *Lupinus angustifolius*. Several losses of chrysanthemums due to *A. ritzema-bosi* are recorded and *Fergusobia curriei* is common in eucalypt-galls associated with the flies of the genus *Fergusonina*. M.T.F

390—Journal of Biological Chemistry.

a. BUEDING, E. & MacKINNON, J. A., 1955.—" Hexokinases of *Schistosoma mansoni*." **215** (2), 495–506.

b. BUEDING, E. & MacKINNON, J. A., 1955.—" Studies of the phosphoglucose isomerase of *Schistosoma mansoni*." **215** (2), 507–513.

(390a) Four distinct hexokinases, each one of which reacts specifically with glucose, fructose, mannose or glucoasmine, were found in homogenates of *Schistosoma mansoni*. Some properties of these enzymes are given. W.P.R.

(390b) Phosphoglucose isomerase from *Schistosoma mansoni* and rabbit muscle showed close kinetic similarities, but the antiserum prepared from fowls against the enzyme from the parasite was without effect on the rabbit enzyme but was an effective inhibitor of the parasite's enzyme. W.P.R.

391—Journal of the Bombay Natural History Society.

a. PRAKASH, I. & SHARMA, S. C., 1955.—" Nematodes and hedgehog mortality." **53** (1), 123.
b. SYKES, W. R., 1955.—" Leeches." **53** (1), 148–150.

(391a) At post-mortem on captive hedgehogs being fed on rat-tailed bats, *Rhinopoma kinneari*, innumerable cysts of *Trichinella* sp. were found throughout the viscera. There was no infection in two wild hedgehogs but two fed on 50 rat-tailed bats died on the sixth day with nematodes in the alimentary canal, pericardium, liver, lungs, brain and ribs. Fox cubs and adult mongoose showed no obvious effects when fed on rat-tailed bats "which had *Trichinella* sp. in their alimentary canals". R.T.L.

(391b) In Central Nepal the presence of leeches, usually *Haemadipsa montana*, appeared to be intimately linked with the passage of domestic stock and their distribution to be dependent on these animals. In the higher regions in Nepal the length of time between one blood meal and the next might be even longer than ten months. R.T.L.

392—Journal of Comparative Pathology and Therapeutics.

a. PAVER, H., PARNELL, I. W. & MORGAN, D. O., 1955.—" Some factors influencing the seasonal variation in worm egg counts in Scottish hill sheep." **65** (3), 220–235.
b. GIBSON, T. E., 1955.—" Studies on *Trichostrongylus axei*. IV. Factors in the causation of pathogenic effects by *T. axei*." **65** (4), 317–324.
c. ROSE, J. H., 1955.—" Observations on the bionomics of the free-living larvae of the lungworm *Dictyocaulus filaria*." **65** (4), 370–381.

(392a) Paver *et al.* present a statistical study of the strongyle egg counts (other than *Strongyloides* and *Nematodirus*) of Scottish hill sheep on two farms during the period November 1944 to October 1952. The spring rise is shown to be highly significant and the degree of rise is correlated with the severity of the preceding winter; this effect is probably not due directly to cold but to increased nutritional deficiencies during cold spells. That age, up to four years, has a highly significant effect on worm counts is demonstrated; hoggs aged 6 to 16 months showed counts about three times greater than did ewes over three years old but between four and six years there was no significant difference. Individual differences in counts between sheep born on the same "heft" in the same year may be very great and may persist until the age of three years; this may be attributed to differences in inherent resistance. S.W.

(392b) Gibson carried out experiments using pairs of twin lambs one of which was infected with *Trichostrongylus axei* larvae and the other kept as the uninfected control; some were kept on a full diet of hay and concentrates, the others on a poor diet of hay only. Throughout the experiment the control sheep gained weight steadily and food consumption increased. The infected sheep gained weight similarly until the twelfth week when there was a drop in food consumption accompanied by loss in weight; the sheep continued to lose weight until the 21st week and the loss of appetite continued until the 25th week; from the 22nd week they gained weight steadily at much the same rate as the controls but remained always about 35 lb. lighter. In another experiment a group of uninfected sheep were kept on a diet restricted in amount to that consumed by infected sheep. Their weight gain was intermediate between that of uninfected controls on a full diet and the infected sheep. S.W.

(392c) Rose found that larvae of *Dictyocaulus filaria* kept out of doors on herbage grown in boxes survived for different periods at different seasons; the maximum survival time was 23 weeks (1st January to 23rd June) and the minimum seven weeks (10th June to

5th August). During November and December larvae took six weeks to develop to the infective stage but did so in less than one week in June and August. Many larvae migrated from the faecal pellets on to the herbage and were capable of migrating up grass blades to a height of two inches, although most remained in the bottom half-inch. Laboratory experiments showed that mortality amongst larvae in dried out faeces was much greater than in wet faeces and that the maximum period of survival was much reduced in dry faeces. First-stage larvae succumbed readily to desiccation but second-stage and especially third-stage were more resistant, a few surviving four days at a relative humidity of 75%. Larvae showed considerable resistance to temperatures below freezing point, some third-stage larvae surviving for 19 days. Larvae developed to the infective stage in five days at 25°C. but took 20 days at 5°C. S.W.

393—Journal of the Egyptian Medical Association.

a. RAGHEB, M., ERFAN, H., EL DEEB, A. & MAHFOUZ, M., 1955.—" Radiological study of hepatic bilharziasis." **38** (3), 159–165.
b. EL-GINDY, M. S., 1955.—" The life cycle of a schistosome liberated from the snail *Pyrgophysa forskali* (Ehrenberg)." **38** (3), 166–170.
c. AYAD, N., 1955.—" The importance of anti-pollution measures in the campaign against Bilharzia." **38** (4), 223–228.
d. ELWI, A. M. & EL-TIRAEI, I., 1955.—" Bilharziasis of the appendix. A pathological study " **38** (5), 311–326.
e. AL-DEEB, A. A., 1955.—" The risks and complications of contrast media in visceral bilharziasis." **38** (6), 359–362.

(393a) The pattern of blood vessels in the spleen, liver, portal and mesenteric systems in patients with schistosomiasis was observed by percutaneous splenic venography using the Abeatici & Campi technique. The splenic and portal veins are large and tortuous; the main intra-hepatic branches are ill defined, with wavy contour and interrupted course; collateral veins run in the direction of stomach and oesophagus, especially at the cardia, with broad veins in the oesophagus; the intra-hepatic branches are few and irregular in diameter, terminating in a rich plexus of minute and diffuse vessels; the opacity of the liver is greatly reduced. M.MCK.

(393b) For the first time in Egypt *Pyrgophysa forskali* was found naturally infected with schistosome cercariae. Seven out of 1,466 specimens of this mollusc were infected. Two male flukes were recovered from one mouse and three male flukes were recovered from another mouse exposed to some of these cercariae. The worms appeared to be *Schistosoma haematobium*; the posterior position of the union of the intestinal caeca excluded *S. bovis*. M.MCK.

(393c) Ayad discusses suitable government methods of educating the public against the faecal pollution of streams for preventing schistosomiasis in Egypt. M.MCK.

(393e) Al-Deeb reviews the toxic effects caused by injecting quantities of contrast media (organic iodine compounds) for rendering channels of elimination or blood vessels visible at X-ray in cases of visceral schistosomiasis. In his 65 patients the toxic effects included transient paralysis, diabetes mellitus and jaundice; one of the cases with jaundice died. M.MCK.

394—Journal of the Elisha Mitchell Scientific Society.

a. BREWER, O. M., 1955.—" A study of the effects of *Salmonella typhimurium* on the acquired resistance of mice to *Trichinella spiralis*." [Abstract of paper presented at the 52nd Annual Meeting of the North Carolina Academy of Science, May 6–7, 1955.] **71** (2), 170–171.

(394a) In mice with natural and with acquired resistance to *Trichinella spiralis* a reduction in the number of the intestinal forms occurred in those which received *Salmonella typhimurium* with the challenging infection. This reduction was apparently mechanical. The intestinal inflammation caused by the bacteria apparently prevented the worms from attaching themselves to the mucosa. R.T.L.

395—Journal of Experimental Medicine.

a. SHOPE, R. E., 1955.—" The swine lungworm as a reservoir and intermediate host for swine influenza virus. V. Provocation of swine influenza by exposure of prepared swine to adverse weather." **102** (5), 567–572.

(395a) The lungworm of pigs serves as a reservoir and intermediate host for swine influenza but the virus is masked and must be provoked to infectivity before it can cause illness. That this is brought about by adverse weather conditions is now supported by experimental evidence but the exact constituent of the meteorological complex responsible remains undetermined. R.T.L.

396—Journal of the Fisheries Research Board of Canada.

a. DOMBROSKI, E., 1955.—" Cestode and nematode infection of sockeye smolts from Babine Lake, British Columbia." **12** (1), 93–96.
b. MARGOLIS, L. & PIKE, G. C., 1955.—" Some helminth parasites of Canadian Pacific whales." **12** (1), 97–120.
c. BISHOP, Y. M. M. & MARGOLIS, L., 1955.—" A statistical examination of *Anisakis* larvae (Nematoda) in herring (*Clupea pallasi*) of the British Columbia coast." **12** (4), 571–592.

(396a) Dombroski found that one-year-old smolts of *Oncorhynchus nerka* migrating from Babine lake were infected with *Eubothrium salvelini* and *Philonema oncorhynchi*. In 1952 and 1953, 102 of 1,654 and 87 of 1,234 respectively were infected with both parasites, 27% and 31% with cestodes only and 12% and 11% with nematodes only. Fish infected with *E. salvelini* only or with both parasites were significantly smaller than uninfected fish or those harbouring nematodes only. In 1952 fish infected with *P. oncorhynchi* were significantly larger than uninfected fish although this was not so in 1953. The possible reasons for this are discussed. S.W.

(396b) Margolis & Pike record a number of helminths, including two new species, from cetaceans caught off the coast of British Columbia. *Lecithodesmus spinosus* n.sp., from two sei whales (*Balaenoptera borealis*), is readily differentiated from the other two species of the genus by its size, being considerably larger than *L. nipponicus*, and shorter and thinner but relatively broader than *L. goliath*. *Crassicauda pacifica* n.sp. is described from fragments of females from the kidneys of a fin whale (*B. physalus*); it is differentiated from *C. giliakana*, *C. magna* and *C. fuelleborni* by the complete constriction of the head in the region of the buccal cavity, from *C. bennetti* by the absence of a thickened belt of chitin around the middle portion of the eggs and from other species by its greater diameter (5 mm. to 7·5 mm.). *B. physalus* is a new host record for *L. goliath* and *Phyllobothrium delphini*, and *Berardius bairdii* is a new host for *Anisakis simplex*. *Ogmogaster plicatus*, *Bolbosoma turbinella*, *L. goliath*, *P. delphini*, *Anisakis* sp. and *A. simplex* are new records for the north-eastern Pacific Ocean. S.W.

(396c) During the winter fisheries of 1950–51 and 1951–52, Bishop & Margolis studied the incidence of *Anisakis* larvae in *Clupea pallasi* off the coast of British Columbia. The intensity of infection varied greatly in different herring populations; the maximum level of infection was between 90% and 100% in Queen Charlotte Sound, decreasing north and south of this area. Fish in their first year of life were not infected but thereafter the intensity increased with age; there was no difference in the incidence in males and females. S.W.

397—Journal of Helminthology.

a. DOUGHERTY, E. C., 1955.—" The genera and species of the subfamily Rhabditinae Micoletzky, 1922 (Nematoda): a nomenclatorial analysis—including an addendum on the composition of the family Rhabditidae Örley, 1880." **29** (3), 105–152.
b. EDWARDS, E. E., 1955.—" Further observations on the occurrence of nematodes of the genus *Meloidogyne* in the Gold Coast." **29** (3), 153–170.

(397a) In 1953, Dougherty [for abstract see Helm. Abs., **22**, No. 434i] published a brief commentary on Osche's revision of the Rhabditinae. In this present paper he gives his reason for those comments and actions. He reviews the genus *Rhabditis* (sensu lato) and

comments on numerous names which have been made synonyms. The genera and subgenera of the Rhabditinae are given as (i) *Pelodera* Schneider, 1866 with four subgenera, (a) *Pelodera* (Schneider, 1866) Dougherty, 1953, (b) *Cruznema* (Artigas, 1927) Dougherty, 1953, synonym *Epimenides* Gutiérrez, 1949, (c) *Coarctadera* Dougherty, 1953, (d) *Cylindridera* Dougherty, 1953; (ii) *Rhabditis* Dujardin [1844] with five subgenera, (a) *Rhabditis* (Dujardin [1844]) Osche, 1952, (b) *Pellioditis* Dougherty, 1953, (c) *Choriorhabditis* Osche, 1952, (d) *Cephaloboides* Rahm, 1928, synonyms *Cuticularia* van der Linde, 1938 and *Curviditis* Dougherty, 1953, (e) *Rhabditella* Cobb, 1929; (iii) *Rhabditoides* Goodey, 1929; (iv) *Caenorhabditis* (Osche, 1952) Dougherty, 1953; (v) *Mesorhabditis* (Osche, 1952) Dougherty, 1953; (vi) *Teratorhabditis* (Osche, 1952) Dougherty, 1953; (vii) *Protorhabditis* (Osche, 1952) Dougherty, 1953; (viii) *Parasitorhabditis* (Fuchs, 1937) Chitwood, 1950. 140 species are listed under their appropriate genus and subgenus. In an addendum certain proposals (which modify the conception of the subfamily Rhabditinae) about the composition of the family Rhabditidae are suggested as follows: (i) Poikilolaiminae n.subf., with two genera *Poikilolaimus* Fuchs, 1930 and *Brevibucca* Goodey, 1935; (ii) Protorhabditinae n.subf. with three genera *Protorhabditis* (Osche, 1952) Dougherty, 1953, ? *Parasitorhabditis* (Fuchs, 1937) Chitwood, 1950, ? *Neorhabditis* Schuurmans Stekhoven, 1954; (iii) Diploscapterinae Micoletzky, 1922 with one genus *Diplogaster* Cobb, 1913; (iv) Rhabditinae Micoletzky, 1922 with seven genera, the first six as above with the addition of *Rhabditonema* Körner, 1954; (v) Bunonematinae with one genus *Bunonema* Jägerskiöld, 1905; (vi) *incertae sedis* one genus *Macramphis* Altherr, 1950. There is also a section on the terminology of the subdivisions of the rhabditoid stoma in which are pointed out the inconsistencies between the Steiner terminology as applied to the cephalobid and diplogasterid stoma and the same terminology as applied to the rhabditid stoma; this is compared with Sach's terminology. J.B.G.

(397b) Edwards lists 76 plants which he has found harbouring root-knot nematodes (*Meloidogyne* sp.) in the Gold Coast and refers briefly in each case to the degree and type of galling. Fourteen plants have not before been reported as hosts, namely: *Commelina lagosensis*, *Ipomoea cairica*, *I. digitata*, *Brachiaria deflexa*, *Panicum maximum*, *Setaria barbata*, *Sorghum arundinaceum*, *Solenostemon ocymoides*, *Hibiscus vitifolius*, *Clitoria ternata*, *Mucuna aterrima*, *Ceratotheca sesamoides*, *Talinum triangulare* and *Clerodendron scandens*. M.T.F.

398—Journal of the International College of Surgeons.

*a. LOZANO, R. H., 1955.—"*Ascaris lumbricoides* and obstructive jaundice; report of a case." **23** (6, Sect. 1), 724–728. [French, German, Italian, Spanish & Portuguese summaries.]

*b. KOTTAKIS, G. & JOANNIDES, O., 1955.—"Omentoplasty and capsulectomy in the treatment of echinococcus cysts of the liver." **23** (6, Sect. 1), 729–734. [French, German, Italian, Spanish & Portuguese summaries.]

399—Journal de Médecine de Lyon.

a. ROMAN, E., 1955.—"Symptomatologie des helminthiases chez l'enfant. Étude d'une centaine de cas observés à la Clinique Médicale Infantile. III. Nématodes rares ou méconnus, *Taenia inerme*. Conclusions." **36** (845), 205–218.

(399a) In the third of his papers on the symptomatology of helminth diseases in children [parts I and II appeared in *J. Méd. Lyon*, **36**, pp. 1–12 and pp. 81–93] Roman discusses strongyloidiasis, ancylostomiasis, trichuriasis and *Taenia saginata* infection. The last mentioned was responsible in several children and, especially, in one adolescent for psychosomatic disturbances. S.W.

400—Journal of the Michigan State Medical Society.

*a. MAYER, W. D. & BEITMAN, M. R., 1955.—"Trichiniasis; report of six cases." **54** (6), 682–686.

401—Journal of Neurology, Neurosurgery and Psychiatry. London.

a. BOGAERT, L. VAN, DUBOIS, A., JANSSENS, P. G., RADERMECKER, J., TVERDY, G. & WANSON, M., 1955.—" Encephalitis in *Loa-loa* filariasis." **18** (2), 103–119.

(401a) Neurological manifestations in the various filarial infections have seldom attracted attention owing to the superimposition of other diseases with meningo-vascular involvement. The authors now review the literature, as the subject may acquire more importance with the increasing use of antifilarial drugs which may cause an initial exacerbation of neurological and psychiatric signs. A detailed report is given of the clinical symptoms and electro-encephalographic findings and of the visceral and neurological lesions in a fatal case of *Loa loa* infection. It is suggested that in treating cases of suspected neural loaiasis with the new filaricides an attempt at desensitization should first be made by fractionating the doses of the lysing drug or combining it with antihistaminic substances. R.T.L.

402—Journal of Neurosurgery. Springfield, Illinois.

a. MITSUNO, T., 1955.—" Cerebral granuloma caused by *Schistosoma japonicum*." **12** (3), 291–299.

b. ARANA-IÑIGUEZ, R. & SAN JULIÁN, J., 1955.—" Hydatid cysts of the brain." **12** (4), 323–335.

(402a) Osteoplastic craniotomy on a Japanese student from Kyushu Island with severe headaches, visual disturbances and epileptic seizures, revealed two greyish-white firm masses, each about the size of a sparrow's egg, underlying the left parietal cortex. These granulomata, on section, showed yellowish, miliary spots with a necrotic zone and contained *Schistosoma japonicum* eggs. R.T.L.

403—Journal of Parasitology.

a. VOGE, M. & RAUSCH, R., 1955.—" Occurrence and distribution of hymenolepidid cestodes in shrews." **41** (6), 566–574.

b. MANN, P. H., HARFENIST, M., & DE BEER, E. J., 1955.—"The effectiveness of piperazine citrate against intestinal helminths of the cat and dog." **41** (6), 575–578.

c. SCHILLER, E. L., 1955.—" Studies on the helminth fauna of Alaska. XXVI. Some observations on the cold-resistance of eggs of *Echinococcus sibiricensis* Rausch and Schiller, 1954." **41** (6), 578–582.

d. ALLEN, R. W., 1955.—" Parasites of mountain sheep in New Mexico, with new host records." **41** (6), 583–587.

e. SOGANDARES-BERNAL, F., 1955.—" Some helminth parasites of fresh and brackish water fishes from Louisiana and Panama." **41** (6), 587–594.

f. BAIR, T. D., 1955.—" The oxygen consumption of *Rhabditis strongyloides* and other nematodes related to oxygen tension." **41** (6), 613–623.

g. KLINK, G. E. & BURROWS, R. B., 1955.—" Ingestion of *Trichuris trichiura* ova by *Balantidium coli*." **41** (6), 634.

h. SORIANO LLERAS, A. & PAN, C., 1955.—" Two cases of *Physaloptera* infection in man from Colombia." **41** (6), 635.

i. MANN, P. H., 1955.—" Additional information pertaining to the incidence of heartworms and intestinal helminths in stray cats and dogs in Bergen County, northern New Jersey." **41** (6), 637.

j. SENGER, C. M. & NEILAND, K. A., 1955.—" Helminth parasites of some fur-bearers of Oregon." **41** (6), 637–638.

k. HALL, J. E. & SONNENBERG, B., 1955.—" Some helminth parasites of rodents from localities in Maryland and Kentucky." **41** (6), 640–641.

l. BERRIOS-DURAN, L. A., 1955.—" An efficient device for exposing mice to schistosome cercariae and holding small animals for post mortem examination." **41** (6), 641–642.

(403a) The cestode fauna of the Soricidae is, with few exceptions, limited to the Hymenolepididae. Examination of North American data shows that shrews are frequently as well as heavily parasitized and that there is a high incidence of multiple infections; this is correlated with the feeding habits of the hosts. Hymenolepidids of small strobila size are frequently present in large numbers whereas those of larger body size occur most often in low numbers in individual hosts. Although there appears to be a complete lack of host

specificity to different species of shrews, the hymenolepidids of the Soricidae are morphologically distinct and do not occur in other insectivores or mammals; similarly those parasitic in other insectivores and mammals are not found in shrews. European forms neither occur in North America nor North American forms in Europe but in North America the geographical distribution of the various species is wide. Shrews do not appear to develop cross immunity and the hymenolepidids have achieved a high level of physiological compatibility. The following are new host records for Alaska: *Hymenolepis parva*, *H. falculata*, *H. sphenomorphus* and *H. intricatus* in *Sorex obscurus*, *H. parva*, *H. falculata*, *H. sphenomorphus* and *H. schilleri* in *S. cinereus*, and *H. parva* in *S. palustris*. S.W.

(403b) Mann *et al.* tested piperazine citrate, given orally at a dosage of 100 mg. per kg. body-weight daily for ten days, against helminths in a number of cats and dogs. The treatment was highly effective against ascarids, slightly effective against *Ancylostoma caninum* and *Taenia taeniaeformis* but useless against *Trichuris vulpis* and *Dipylidium caninum*. There were no toxic effects, the drug had no effect on pregnancy and no gross pathological lesions of the gut were observed post mortem. S.W.

(403c) Schiller found that gravid proglottides of *Echinococcus sibiricensis*, obtained from carcasses of naturally infected Arctic foxes which had been naturally frozen, exposed to temperatures as low as −40°C. and subsequently kept at 5°C. to −37°C. for six weeks, produced alveolar larvae when fed to field voles. Eggs kept in semi-liquid gut contents at −26°C. for periods varying from 21 hours to 65 days were fed to groups of red-backed voles (*Clethrionomys rutilus dawsoni*); after freezing for as long as 360 hours all voles became infected; after 35 and 54 days one out of each group of three voles was positive but all were negative after 65 days. Eggs were also kept for up to six days with the temperature lowered by 5°C. every 24 hours to a minimum of −56°C. The lowest temperature at which they remained infective was −51°C.; exposure to −56°C. resulted in a characteristic fracturing of the eggs. Proglottides from naturally infected and naturally frozen carcasses were kept at a temperature of −26°C. and fed to groups of voles at intervals; they were infective after four and 27 days (all voles positive) and after 42 days (seven voles positive, two negative) but not after 61 and 102 days. S.W.

(403d) Allen has identified six helminths parasitic in *Ovis canadensis mexicana* in southern New Mexico, namely *Skrjabinema ovis* (commonest and most numerous), *Haemonchus placei*, *Cysticercus tenuicollis*, *Trichuris* sp. (probably *T. discolor*), *Pseudostertagia bullosa* and a single larva of *Oesophagostomum* sp. The last three are new records for this host and *S. ovis* has not been previously reported in this host in the Southwest. All but the pinworms have been reported in cattle in the area. S.W.

(403e) *Bucephaloides trichiuri* n.sp. from the pyloric caeca of *Trichiurus lepturus* is most closely related to *B. gracilescens* but differs in the extension of the excretory vesicle to the pharynx and in that the uterus does not extend forward past the ovary. *Fellodistomum mendezi* n.sp. from the intestine of *Brachyrhaphis episcopi* is most closely related to *F. agnotum* but is smaller, the vitellaria extend from the testes to the middle of the oral sucker, the testes are larger and the gut caeca narrower. *Neochasmus ictaluri* n.sp. from the intestine of *Ictalurus furcatus* is separated from all other species of the genus by the possession of 22 oral spines. *Derogenes tropicus* is transferred to *Halipegus* as *H. tropicus* n.comb. The following are new host records: *Diplostomum* sp. in the eyes of dorosomid fish, *Phyllodistomum superbum* and *Spirocamallanus pereirai* in *Micropogon undulatus*, *Halipegus genarchellus* in *Roeboides guatemalensis* and *Haplobothrium globuliforme* in *Anguilla rostrata*. A number of other helminths are also recorded. S.W.

(403f) Bair describes the techniques used in his study of the oxygen consumption of nematodes at oxygen tensions between 20·7 and 383·1 mm. of mercury and the relation of oxygen tension to their time of survival. The oxygen consumption of *Rhabditis elegans* increased

with increasing oxygen tension up to 121·5 mm. mercury but not beyond this. In *R. strongyloides* the maximum oxygen consumption was at a tension of 58·5 mm., beyond this increasing tension had little effect on consumption. The free-living larvae of small horse strongyles showed a very low constant oxygen consumption which did not vary with the tension. *R. strongyloides* and *Rhabditella axei* showed increased survival times with increasing oxygen tension. The results are illustrated by a series of graphs and the adaptive significance is discussed. S.W.

(403g) Klink & Burrows, while examining a faecal sample, observed that approximately 1% of the trophozoites of *Balantidium coli* present had ingested ova of *Trichuris*; some ova appeared to have been digested. Ova of *Heterodera marioni* and hookworm, although present in the stool in small numbers, had not been ingested. S.W.

(403h) The authors record that in the faeces of two unrelated patients they found ova of *Physaloptera* sp. No worms were obtained after treatment of one of the patients but the faeces became negative for ova. The other patient was not treated. Neither showed any symptoms which could be related to the infection. S.W.

(403i) Mann tabulates the helminths found in 300 cats and 100 dogs: 72% of both hosts were infected. *Dirofilaria immitis* occurred in four dogs but not in any of the cats. *Trichuris vulpis* and *Dipylidium caninum* were the most common in the dogs and ascarids with or without *D. caninum* were present in most of the cats. *Trichuris* did not occur in the cats. S.W.

(403j) Senger & Neiland list the helminths found in *Ondatra zibethica*, *Castor canadensis*, *Mustela vison*, *M. frenata*, *Mephitis mephitis* and *Procyon lotor*. Of particular interest was the occurrence of heavy infections with immature *Hymenolepis* sp. in two musk-rats; *Metagonimoides oregonensis* was found in mink for the first time. Six *Lutra canadensis* examined were free of helminths. S.W.

(403k) Hall & Sonnenberg list under their hosts the helminths collected from rodents at Fort Meade, Maryland and Fort Knox, Kentucky. A total of 104 out of 213 rodents from the first locality and 75 out of 156 from the second were infected. The host species were *Microtus pennsylvanicus*, *Mus musculus*, *Peromyscus leucopus*, *Pitymys pinetorum* and *Rattus norvegicus*. Some of the parasites could not be precisely identified. None are given as new host or locality records. S.W.

(403l) Berrios-Duran describes in detail and gives drawings of a small apparatus for holding mice and exposing them to schistosome cercariae. It has advantages over that described by Stirewalt & Bronson [for abstract see Helm. Abs., **24**, No. 122 o] in that it is easily made by an unskilled worker, the materials are readily available, the mouse is more easily removed and its tail does not need to be taped, and rotation of the mouse in the tube does no harm. When not in use for this purpose the apparatus can be turned over and used to hold small animals for autopsy. S.W.

404—Journal of Tropical Medicine and Hygiene.

a. SHARAF EL DIN, H. & EL NAGAR, H., 1955.—" Control of snails by copper sulphate in the canals of the Gezira irrigated area of the Sudan." **58** (11), 260–263.

(404a) The Gezira canals are heavily infested with *Bulinus truncatus* and *Biomphalaria boissyi* and schistosomiasis is common in the farming population. An initial experiment on two of the canals, followed by a large scale experiment on a group of 14 canals, showed that snails were eradicated by clean weeding and by an initial application of copper sulphate at a concentration of 30 p.p.m. followed by a maintenance dose giving a concentration of 0·125 p.p.m. The chemical was applied in cloth bags at the beginning of the canals. Copper sulphate keeps down weeds and is cheaper and easier to apply than sodium pentachlorophenate. M.MCK.

405—Journal of the Zoological Society of India.

a. PREMVATI, 1955.—"*Cercaria multiplicata* n.sp. from the snail *Melanoides tuberculatus* (Müller)." **7** (1), 13–24.

(405a) *Cercaria multiplicata* n.sp. from *Melanoides tuberculata* collected at Lucknow develops in sporocysts of three distinct generations. The mother sporocysts may contain only the miracidia; the second generation sporocysts may contain daughter sporocysts and the miracidia and the third generation sporocyst may contain cercariae at various developmental stages without any miracidia in it. The miracidium inside the sporocyst measures 0·15 mm. by 0·55 mm. It has no eye-spots, has 22 epidermal plates, is covered with cilia and shows rapid movements within the sporocyst and can swim outside the body. *C. multiplicata* differs from the nearest forms in having an elongated pre-pharynx, three groups of penetration glands and eight pairs of flame cells, six in the body and two in the tail. The furcal rami are shorter than the tail stem. R.T.L.

406—Karakulevodstvo i Zverovodstvo.

a. SICHKOV, N. V., 1955.—[The treatment of sheep for gid.] 8 (2), 61. [In Russian.]
b. DUBNITSKI, A. A., 1955.—[Intermediate hosts in the cycle of development of the nematode *Filaroides bronchialis*.] 8 (3), 51–52. [In Russian.]

(406a) Sichkov describes a method of dealing with *Coenurus cerebralis* in sheep. The position of the bladder-worm is found by palpation, the wool is removed and the area is twice wiped with tincture of iodine. The injection needle is introduced into the centre of the bladder-worm through the skin and bone and the fluid from the bladder-worm is removed by syringe; 1·0–1·5 ml. of a 15%–25% solution of hexachlorane in vegetable oil is then introduced into the lumen of the bladder by syringe; the needle is removed and the area is again wiped with tincture of iodine. Out of 131 sheep treated by this method only six died. C.R.

(406b) Dubnitski was able to infect *Agriolimax reticulatus* with the larvae of *Filaroides bronchialis* from a polecat. The larvae reached the infective stage in 16–18 days and when the slugs were fed to minks they developed to maturity in 19–25 days. Dubnitski also found that mice fed with infected slugs became transport hosts, as the larvae became encysted in the liver. These mice fed to minks and polecats produced infections of *F. bronchialis* in these animals and larvae were found in the faeces 21–24 days after feeding. The author remarks that these helminths are found only in animals kept in pens without wire flooring or in the wild. C.R.

407—Khirurgiya. Moscow.

a. BELYAEV, A. A., 1955.—[Acute obstruction of the common bile duct caused by ascariasis.] Year 1955, No. 5, pp. 79–80. [In Russian.]
b. TAKELLA, I. P., 1955.—[Widespread ascariasis of the biliary tract.] Year 1955, No. 5, p. 90. [In Russian.]
c. IZMAILOV, G. S., 1955.—[Echinococcus of the mammary gland.] Year 1955, No. 6, p. 67. [In Russian.]
d. PAPAZYAN, D. S., 1955.—[Echinococcus of the mammary gland.] Year 1955, No. 6, p. 68. [In Russian.]

408—Khirurgiya. Sofia.

*a. DIMOV, G. & GAZURKOV, I., 1955.—[Cardiac echinococcosis.] 8 (1), 81–82. [In Bulgarian.]

409—Kinderärztliche Praxis.

*a. MÖSSMER, A., 1955.—"Über *Taenia saginata* im Säuglingsalter." **23** (2), 67–69.

410—Lancet.

a. MASTERTON, J. P. & LEWIS, H. E., 1955.—"Trichinosis in Greenland." Year 1955, **2** (6890), 591.
b. SEATON, D. R., 1955.—"On expelling tapeworms with mepacrine." Year 1955, **2** (6891), 644–645.
c. JONES, I., 1955.—"On expelling tapeworms with mepacrine." [Correspondence.] Year 1955, **2** (6892), 727.
d. BEATTY, R. P., 1955.—"On expelling tapeworms with mepacrine." [Correspondence.] Year 1955, **2** (6892), 727.

(410a) Following a case of suspected trichinelliasis in a member of the British North Greenland Expedition, Masterton & Lewis examined nine dogs, six foxes and seven new-born puppies for the infection. Seven of the dogs were infected; these had been brought from West Greenland. On returning home the patient was found to have filariasis contracted previously in the tropics. S.W.

(410b) Finding male fern extract unreliable against *Taenia saginata* infections and conducive to vomiting, Seaton tested mepacrine. This removed the complete worm in 12 out of 15 people after one treatment. Patients received liquids only for two days; a saline purge was given each day and an enema on the second day; three grains of sodium amytal were given on the second evening and a Ryle's tube was passed. One gramme of mepacrine in 100 ml. of warm water was given down the tube on the third day, followed 15–30 minutes later by 1·5–2 oz. of magnesium sulphate similarly administered. A second treatment cured two more patients. M.MCK.

(410c) Unlike Seaton [for abstract see No. 410b above] Jones has found that male fern extract never fails to remove tapeworms complete with scolex, provided that two drachms of sodium bicarbonate, dissolved in a minimum of water, is first given on an empty stomach. M.MCK.

(410d) Beatty has found male fern extract reliable and non-toxic in eliminating tapeworms. For three days the patient should take fluid magnesia thrice daily and no solid food. On the third evening a dose of emulsion is given as advised by Burney Yeo. M.MCK.

411—Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent.

a. BRANDE, J. VAN DEN, KIPS, R. H. & D'HERDE, J., 1955.—"Doding van *Heterodera rostochiensis*-cysten op Begonia- en Gloxinia-knollen." **20** (3), 271–278. [English summary pp. 277–278.]
b. BESEMER, A. F. H. & OOSTENBRINK, M., 1955.—"Phytotoxische en nematicide nawerking van grondontsmettingen met DD." **20** (3), 279–290. [English summary p. 289.]
c. BIJLOO, J. D., 1955.—"Een eenvoudige methode voor het bepalen van de inhoud van grote aantallen cysten van *Heterodera*-soorten." **20** (3), 291–300. [English summary p. 300.]

(411a) In treatments of tubers of Begonia and Gloxinia together with cysts of *Heterodera rostochiensis*, excellent results were given by an emulsion of chlorobromopropene at concentrations of 0·05% for 20, 40 and 60 minutes, and 0·025% for 40 and 60 minutes. A 100% kill of cysts without injury to the tubers was also given by 0·5% formalin at 43°C. for 60 minutes. Treatment with the organic mercurial Aabulba damaged the tubers. M.T.F.

(411b) Field soils infested with *Pratylenchus* spp. were injected with D-D mixture at rates of 40–60 c.c. per sq. m. and various crops including carrots, beets, lucerne, tomatoes, peas and rye-grass were grown. In all cases there was damage due to the D-D, including damping off of seedlings and retardation of growth, although from 25 days to six months elapsed between treatment and sowing or planting of the crop. In a cold glass-house infested

with *Meloidogyne* sp. treated with 40–50 c.c. per sq. m. of D-D in November, lettuces planted 11 weeks later were damaged. A mixed population of *Hoplolaimus uniformis* and *Pratylenchus penetrans* was greatly reduced by treatment with D-D at 60 c.c. per sq. m. and *Chrysanthemum maximum* and *Dianthus* spp. were successfully grown for three years. Chloropicrin protected similar crops in the field for only two years. M.T.F.

(411c) Bijloo describes an improved form of his homogenizer technique [for abstract see Helm. Abs., **23**, No. 429b] for crushing cysts of *Heterodera* sp. for estimations of egg and larval contents. The cysts are placed in water in a perspex tube into which dips a perspex cylinder which rotates at a speed of 900 r.p.m. The tube is rotated by hand in the opposite direction at about 80 r.p.m. Rotation is for about one minute and the cysts are crushed between the tube wall and the cylinder. For cysts of *H. schachtii* it is advised to continue for one and a half minutes. Longer times increase damage to the eggs and larvae. The suspension is diluted and agitated while aliquots are withdrawn for counts of eggs and larvae. M.T.F.

412—Medical Journal of Australia.

a. LIDGETT, K., 1955.—" Hydatid cyst of the orbit: report of a case." 42nd Year, **1** (22), 796

413—Medicina. Revista Mexicana.

a. RUIZ REYES, F., 1955.—" Oncocercosis. Observaciones de actualidad." **35** (731), 401–409.

(413a) In this campaign against onchocerciasis in Mexico, diethylcarbamazine is given to patients for five days only at dosages (per kg. body-weight) of either 10 mg. on the first two days and 5 mg. on each of the last three days, or 10 mg. on the first, 5 mg. on the second and 2 mg. on the third, fourth and fifth days. The tablets available should contain more of the drug, e.g. 100 mg. or 200 mg., to avoid the large numbers of tablets necessary for heavy patients. Ruiz Reyes tabulates the locations in the body of over 10,000 nodules excised during 1946, 1947 and 1954. He lists the onchocercal eye disturbances found in 731 residents of Comaltepec. In the basin of the Despoblado, where onchocerciasis has an incidence of 80%, 260 streams in eight localities were treated with D.D.T. at rates of 1 p.p.m. to 5 p.p.m. When D.D.T. was applied to stretches of 300 m. every 15 days for about a year, the number of simuliids caught with human bait markedly decreased. Insecticidal mists (Swing-fog) against adult simuliids killed all classes of insects. M.McK.

414—Medicina Colonial. Madrid.

a. MATILLA, V., 1955.—" Normalización de las reacciones biológicas que se utilizan en el diagnóstico de la hidatidosis." **25** (1), 5–15.
b. FERNÁNDEZ NAFRIA, A., 1955.—" Cisticercosis meningoencefálica múltiple. (A propósito de un caso.)" **25** (6), 546–550.
c. APARICIO GARRIDO, J., 1955.—" La piperazina en el tratamiento de la enterobiasis y la ascaridiasis." **26** (2), 109–115.

(414a) Addressing the Fifth International Congress on hydatidosis (held in Madrid), Matilla discusses skin and serological tests for hydatid infection and advocates standardization of procedure in their clinical application. M.McK.

(414c) Aparicio Garrido treated enterobiasis with piperazine given in tablets, or in a sweetened solution, at the rate of 0·8 gm. to 2·4 gm. according to age, daily, for two periods of seven days separated by a week's rest. This cured 49 out of 58 patients. A second treatment cured seven more. Ten children with Ascaris were given 2 gm. to 3.3 gm. daily for three days followed by a purge. All were cured. M.McK.

415—Meditsinskaya Parazitologiya i Parazitarnie Bolezni. Moscow.

a. BUSLAEV, M. A., 1955.—[Results of the control of malaria, helminthiases and other parasitic diseases in the USSR in 1954 and problems for 1955.] **24** (3), 195–200. [In Russian.]
b. KOVTUN, A. S., 1955.—[Results of the control of malaria, helminthiases and other parasitic diseases in RSFSR in 1954.] **24** (3), 201–204. [In Russian.]
c. SELIVANOV, K. P., 1955.—[Results of the control of parasitic diseases in the Ukraine during 1954 and plans for 1955.] **24** (3), 204–207. [In Russian.]
d. ROSITSKI, B., 1955.—[The development of parasitology in the Czechoslovakian People's Republic.] **24** (3), 239–242. [In Russian.]
e. BAZHENOVA, N. A., 1955.—[Certain aspects of the epidemiology of Diphyllobothrium disease in the Leningrad region.] **24** (3), 242–248. [In Russian.]
f. SHMELEVA, Z. A., 1955.—[The epidemiology of Diphyllobothrium disease in the Finno-Karelian SSR.] **24** (3), 248–252. [In Russian.]
g. RIVKIS, E. I., 1955.—[Experimental control of Diphyllobothrium disease in collective fish farms.] **24** (3), 252–253. [In Russian.]
h. KARASEVA, A. N., AFANASEV, D. S. & KHOKHRYAKOV, A. S., 1955.—[A study of the epidemiology of Diphyllobothrium disease in the Astrakhan region.] **24** (3), 253–255. [In Russian.]
i. TITOVA, S. D., 1955.—[Survival of plerocercoids of *Diphyllobothrium latum* in the presence of low temperatures and salt.] **24** (3), 255–256. [In Russian.]
j. DANIELOV, N. Y., 1955.—[The eradication of ascariasis in the industrial village of Ararat.] **24** (3), 257–259. [In Russian.]
k. SEMENOVA, N. E., 1955.—[The experimental treatment of hymenolepiasis with substances of the acridine series.] **24** (3), 260–262. [In Russian.]
l. KOTOVA, Z. N., 1955.—[Experimental chemotherapy of hymenolepiasis with substances of the acridine series.] **24** (3), 262–265. [In Russian.]

(415e) The average *Diphyllobothrium* infection of the population in the Leningrad region was 2% with areas of higher infections in fishing districts. In areas near the Gulf of Finland and on the south-western shore of Lake Ladoga the average infection was 2·3% with a maximum of 25% and on the eastern shore it was 10–20% with a maximum of 60% for some villages. 60% of the infected were without symptoms. The most highly infected were fishermen (74%) and other workers of the fish trade (71·1%). G.I.P.

(415f) The infection with *Diphyllobothrium* of the Finno-Karelian population was examined in relation to their contact with fish. It varied from 10% in the Pudozh fishing district to 42% in the Zaonezh agricultural district. Children up to seven years of age were generally less infected than adults (e.g. 3·5% and 40% respectively in the Petrovsk district). It was found that the degree of infection depended on the way in which the fish was prepared for eating by a given population and that infection was contracted through eating slightly salted and therefore half-raw fish, which was not usually given to children. The three most highly infected of the 12 fish species examined for plerocercoids are mentioned. G.I.P.

(415g) The treatment with male fern extract of the population in two collective fishing villages resulted in a decrease of the *Diphyllobothrium* infections the following year from 11·6% to 0·86% of the population in one village and from 5·5% to 2·5% or less, in the other. 50–70% of the treated persons passed scolices and one-and-a-half to two months after treatment none passed eggs. No secondary infections occurred. G.I.P.

(415h) *Diphyllobothrium latum* plerocercoids were found in fish from the Volga Delta. Particularly infected were pike caught in spring. The use of raw pike roe as food is one of the causes of infection of the population in this region. G.I.P.

(415i) Pike infected with *Diphyllobothrium latum* were kept at cold temperatures and in strong brine solution and the plerocercoids were dissected out at day intervals and tested for their viability. At –6°C. larvae from fish 9 kg. in weight were dead on the 7th day, from fish 2 kg. in weight on the 6th day and from fish 700 gm. in weight on the 3rd day. At –18°C. death of larvae from fish 1·6–2·5 kg. in weight occurred on the 4th day and from fish 450 gm. in weight on the 2nd day. In brine, larvae from pike 1·4 kg. in weight were dead on the 5th day and from pike 450 gm. in weight on the 3rd day. These data determine the time when pike from infected reservoirs can be safely marketed. G.I.P.

(415j) The complex measures used against Ascaris infections in Ararat village included treatment in spring and autumn and examination before and after treatment of the population, sanitary measures and sanitary instruction, and reduced an infection of 46·7% in 1952 to 15·9% in 1954. G.I.P.

(415k) Of the three acridine compounds tested against hymenolepiasis in man, compounds "No. 315" and "No. 317" were ineffective, but aminoacridine which gave better results and with only transient side effects is advocated for use against persistent infections where male fern extract had been ineffective. G.I.P.

(415l) Most of the 18 acridine compounds tested against *Hymenolepis nana* in experimentally infected white mice were effective and only slightly toxic. The results obtained with the seven best compounds in doses of 0·0006 or 0·0007 mg. per gm. body-weight and intubated into the oesophagus as an aqueous solution are tabulated. Of these, aminoacridine and its analogues were 100% effective against the mature *H. nana*, while aminoacridine and its oxypropyl derivative were also 100% effective against the larval forms. G.I.P.

416—Medizinische. Stuttgart.

a. LOMBARD, A., 1955.—" Über die Verwendung von Hexylresorcin als orales und rektales Oxyurenmittel." Year 1955, No. 17, p. 656.

(416a) Lombard has used Wurm-Agen, a hexylresorcinol preparation made up in capsules of 0·1 gm., against enterobiasis. Of 48 children treated [dosage not stated] 43 were completely cured, three showed improvement: in only two cases was there failure. Before and after this treatment an ointment called Wurm-Serol (containing hexylresorcinol, aluminium aceto-tartaricum solution and potassium oxyquinoline sulphate, with a milk serum base) was applied to the anus to relieve itching. A.E.F

417—Mémoires de l'Académie de Chirurgie. Paris.

*a. DEMIRLEAU, J. & ZÉRAH, C., 1955.—" Contribution au traitement chirurgical du kyste hydatique du poumon d'après 250 cas." **81** (8/9), 270–274.
*b. LE ROY, A., 1955.—" Hépatectomie droite réglée pour kystes hydatiques multiples du foie dont un calcifié." **81** (10/11), 324–327.
*c. MACRIS, G., 1955.—" Sur un cas rare de rupture d'un kyste hydatique de la rate." **81** (12/13), 377–378.

418—N.A.A.S. Quarterly Review. London.

a. ANON., 1955.—" Migratory root eelworms." No. 30, pp. 261–263.

(418a) The author refers to some of the published work on ectoparasitic nematodes such as *Pratylenchus* spp., *Hoplolaimus* sp. and *Belonolaimus gracilis* and the diseases caused by them. He suggests that much more attention needs to be given to the problem of these migratory eelworms in England. M.T.F.

419—Nature. London.

a. SILVERMAN, P. H., 1955.—" A technique for studying the *in vitro* effect of serum on activated taeniid hexacanth embryos." [Correspondence.] **176** (4482), 598–599.
b. McCULLOUGH, F. S., 1955.—" Apparent resistance of a snail to infection in the Gold Coast." [Correspondence.] **176** (4490), 981–982.
c. STEWART, D. F., 1955.—" 'Self-cure' in nematode infestations of sheep." [Correspondence.] **176** (4496), 1273–1274.

(419a) Silverman, using activated hexacanth embryos of *Taenia saginata* and *T. pisiformis* has studied the reactions in normal and immune calf and rabbit sera. Free activated embryos showed three main types of reaction: (i) precipitates may form around the secretions of the penetrating gland and at other points on the embryos; (ii) a membrane may form enclosing the entire embryo and its secretions; (iii) a lethal and lytic effect was observed in inactivated immune sera and in some active and inactivated normal sera, particularly after periods of

three hours and longer. Activated embryos still within the oncospheral membrane may show a thickening precipitate on the inner surface of the membrane. Embryos remained in a state of constant activity for three hours or more in sera and when left overnight in normal inactivated serum could be reheated and reactivated the following day. S.W.

(419b) A search for the vector of *Schistosoma haematobium* in the Tongu district of the Gold Coast revealed only *Bulinus* (*Pyrgophysa*) *forskali*, which was never found infected. At Accra, laboratory-bred *B.* (*P.*) *forskali* were exposed to large numbers of miracidia of local strains of *S. haematobium* for periods of four or five hours or overnight. The snails were exposed in batches of 20–30, either alone or together with laboratory-bred *Physopsis africana* or *Bulinus* sp., sensu stricto. In no case did *B.* (*P.*) *forskali* become infected; 18 of the 20 *Physopsis africana* and all 20 of the *Bulinus* sp. afterwards shed cercariae. The potential vectors of human schistosomes in Africa and their known roles are discussed. M.McK.

(419c) Two sheep were made hypersensitive to *Haemonchus contortus* by previous infections and then anaesthetized by Kemithal, given intravenously. The abomasum was exposed and injected with massive doses of exsheathed larvae of *H. contortus*. There followed increased peristalsis and within an hour the abdomen became contracted, pale and oedematous. In one sheep the egg count fell in four days to nil from 3,500 e.p.g. and in the other to 400 from 3,600 e.p.g. in seven days. Previous work had shown that the intake of *H. contortus* larvae produced self-cure of infection with this species and *Trichostrongylus colubriformis*. Further experiments show that the intake of *H. contortus* larvae will induce self-cure of infections with *Ostertagia circumcincta* and *T. axei* and intake of larvae of *O. circumcincta* and *T. axei* will cause self-cure of *H. contortus* and *T. colubriformis* infections. The effect of the intake of larvae of one species on infection with other species is a local rather than a systemic reaction. Antigenic material from the abomasum passes to the small intestine but not vice versa. R.T.L.

420—New Zealand Veterinary Journal.

a. WHITTEN, L. K., 1955.—" Paramphistomiasis in sheep." **3** (4), 144.
b. ANDERSON, J. P. & ANDREWS, E. D., 1955.—" The effect of phenothiazine on cobalt-deficent and cobalt-dosed lambs." **3** (4), 150–151.

(420a) Whitten describes an outbreak of paramphistomiasis in a flock of 250 ewes, of which 35 died showing symptoms of diarrhoea and anaemia. Post-mortem examination showed only fairly small numbers of nematodes but a heavy infestation of the duodenum with immature paramphistomes (2,000 odd in one case) was found. Large numbers of *Planorbis kahuika*, infected with paramphistomes and echinostomes, were present in swampy parts of the pasture and the incidence of paramphistome cercariae in June, August, November, February and April was 3%, 20%, 53%, 10% and 19% respectively. Beef cattle grazing the same paddock are believed to have been the source of the infection and it is likely that the parasite was *Calicophoron ijimai*. S.W.

(420b) Experiments were carried out to determine whether parasite control would benefit lambs kept on cobalt-deficient pastures. Regular dosing with phenothiazine did result in a higher weight gain and lower mortality but the results were not statistically significant. When the lambs were given cobalt and phenothiazine no greater increase in weight was made than by those given cobalt alone. D.M.

421—Nigerian Field.

a. RODGER, F. C., 1955.—" Onchocerciasis in the northern Gold Coast." **20** (4), 161–165.

(421a) From a survey in 1954 it was estimated that in many of the villages in an area of about 20,000 square miles in the Northern Region of the Gold Coast every person over twenty years of age was infected with onchocerciasis and that as a result 24,000 had been rendered blind. R.T.L.

422—North American Veterinarian.

a. NIELSEN, S. W., 1955.—" Canine paragonimiasis." **36** (8), 659–662.

(422a) Sixteen *Paragonimus*, probably belonging to *P. kellicotti*, were found in a dog which had died from suffocation and showed pulmonary oedema and congestion. It had regularly eaten shell-fish in rivers in Ontario. Another from the same litter which had been raised elsewhere and had also eaten crayfish was found to be passing *Paragonimus* eggs. M.MCK.

423—Olearia. Rome.

a. GRANITI, A., 1955.—" Un deperimento dell'olivo in Sicilia associato a due specie di nematodi." **9** (5/6), 114–120. [English, French & German summaries pp. 103–104.]

(423a) Olive trees in Sicily suffer from chlorosis and necrosis of leaf tips, dieback of twigs and branches, thickenings and galls on the roots and progressive decline. The disease is associated with the presence of *Rotylenchus erythrinae* and *Meloidogyne* sp. Soil treatment with water-emulsified D-D mixture and with parathion gave encouraging results. This is the first record of the occurrence of *R. erythrinae* on the olive tree. R.T.L.

424—Oyo-Dobutsugaku-Zasshi. Tokyo.

*a. NISHIZAWA, T. & IYATOMI, K., 1955.—[*Nothotylenchus acris* Thorne, as a parasitic nematode of strawberry plant.] **20** (1/2), 47–55. [In Japanese: English summary.]

b. ICHINOHE, M., 1955.— [Two species of the root-knot nematodes in Japan.] **20** (1/2), 75–82. [In Japanese: English summary p. 82.]

(424b) *Meloidogyne incognita* var. *acrita* causes considerable damage to sweet-potatoes in Chiba Prefecture, in the middle of Honshû, and also infects rice, corn, red pepper, water-melon and fig but not peanut or cotton. It has not yet been found in Hokkaido but *M. hapla* damages a wide range of crops there including potato, red pepper, peanut and soya bean but not sweet-potato, water-melon, cotton, rice or wheat. The differences between the two species are pointed out, with illustrations. Hoyer's medium is recommended for mounting parts of *Meloidogyne* females showing perineal patterns. M.T.F.

425—Pakistan Journal of Scientific Research.

a. AKHTAR, S. A., 1955.—" *Syphacia lahorea* n.sp.—a new nematode parasitic in Pennant's squirrel." **7** (1), 1–3.

b. AKHTAR, S. A., 1955.—" On nematode parasites of rats and mice of Lahore, with some remarks on the genus *Aspiculuris* Schulz 1924 & two new species of the genus." **7** (3), 104–111.

(425a) *Syphacia lahorea* n.sp., described and figured from *Funambulus pennanti argentescens* in Lahore, Pakistan, has a stouter body than *S. sciuri* from *Sciurus palmarum*. In *Syphacia lahorea* the spicule is 0·126 mm., the accessory piece is 0·063 mm. and the asymmetrical eggs are 0·09 × 0·032 mm., while in *S. sciuri* the spicule is 0·07 mm., the accessory piece 0·03 mm. and the eggs 0·11 × 0·04 mm. G.I.P.

(425b) In Lahore 64% of 50 rats and 70% of 20 mice examined were infected with nematodes. The most frequent was *Aspiculuris* which is reported for the first time from rats and for the Indo-Pakistan subcontinent. This genus is revised and subdivided into five new subgenera: (i) *Subaspiculuris* without a cephalic bulb, type and only species *A. caviellae*; (ii) *Anaspiculuris* without lateral alae, type and only species *A. americana*; (iii) *Pseudaspiculuris* with cervical alae not ending in sickel-shaped margins, type and only species *A. asiatica*; (iv) *Paraspiculuris* with cervical and lateral alae continuous, type and only species *A. pakistanica* n.sp.; and (v) *Aspiculuris* with cervical and lateral alae not continuous, type *A. tetraptera*, and also containing *A. dinniki*, *A. kazakstanica*, *A. schulzi* and *A. lahorica* n.sp. *A. pakistanica* n.sp. from *Rattus rattus* has a row of longitudinal, laterally compressed crests in front of the cloaca in the male and cervical alae with sickle-shaped margins prolonged

posteriorly at the base to form lateral alae. There is one pair of caudal alae on the tail and another on the ventral process of the tail. *A. lahorica* n.sp. from *Mus musculus* resembles *A. tetraptera* and *A. kazakstanica* but is characterized mainly by its protruded lips, smaller cephalic bulb (0·069 mm. in diameter in the male, 0·084 mm. in the female) and the mouth surrounded by six small papillae. G.I.P.

426—Parasitica. Gembloux.

a. GILLARD, A. & BRANDE, J. VAN DEN, 1955.—" Quelques problèmes concernant les nematodes des racines (*Meloidogyne* spp.) en Belgique, particulièrement la désinfection des tubercules de *Begonia multiflora* par traitement à l'eau chaude." **11** (3), 74–80.

(426a) After outlining the bionomics of the root-knot nematodes and Sasser's host-plant method of identifying the species, the authors indicate the position in Belgium where root-knot disease occurs principally in the nursery and market garden areas. It is wide-spread in begonias and gloxinias around Ghent. Warm-water treatments of root-knot infested tubers of *Begonia multiflora* were carried out and good control without damage to the plants was obtained with treatments for 60 minutes at 45°C. or for 30 minutes at 48°C. Plants treated at 41°C. for one to two hours were stimulated. Large tubers treated for 20 minutes at 43°C. to 48°C. showed an advance of two weeks in growth. M.T.F.

427—Parasitologische Schriftenreihe. Jena.

a. WACHEK, F., 1955.—" Die entoparasitischen Tylenchiden." No. 3, 119 pp.

(427a) In this publication, originally presented as a dissertation at Erlangen in 1952, Wachek has reviewed the taxonomy of those Tylenchida parasitic in insects, and described forty new species, erected five new genera and made eleven new combinations. Wachek stresses the necessity of having adult material for specific determinations and discusses methods of obtaining these adults. Unfortunately, Wachek was unable to fix his material satisfactorily and apparently did not preserve any type material. He also discusses the development of parasitism, types of reproduction, number of ecdyses and host damage shown by these forms, as well as noting the effect of abiotic factors on the eelworms. He proposes a system of evolution for the group and discusses modifications of the various structures of the group. In addition to the descriptions and drawings for many species, keys are provided for all genera and species. He made the following new combinations: *Howardula oscinellae* (Goodey, 1930), *H. aptini* (Sharga, 1932), *H. cuneifer*, *H. terribilis*, *H. claviger* and *H. hirsutus* of Warren, 1941, *Allantonema piceae* (Fuchs, 1929), *A. pini* (Fuchs, 1929), *Parasitylenchus* (*Metaparasitylenchus*) *cossoni* (Wülker, 1929), and *Tripius sciarae* (Bovien, 1944). *Tylenchinema* Goodey, 1930 becomes a synonym of *Howardula* Cobb, 1921 and *Proatractonema* Bovien, 1944 a synonym of *Tripius* Chitwood, 1935. He assigns three new genera, *Protylenchus*, *Parasitylenchoides* and *Sphaerulariopsis* to the Tylenchoidea, and makes three new subgenera, *Parasitylenchus*, *Metaparasitylenchus* and *Proparasitylenchus* in the genus *Parasitylenchus*. Two new genera, *Peraphelenchus* and *Entaphelenchus* are assigned along with the transference of *Scatonema* Bovien, 1932, *Tripius*, and *Sphaerularia* Dufour, 1837 to the Aphelenchoidea. Thirty-three new Tylenchoidea are listed below with their insect hosts (mostly Coleoptera): *Bradynema bibionis* n.sp. from *Bibio* sp., *Bradynema trixagi* n.sp. from *Throscus dermestoides*, *Howardula acarinorum* n.sp. from *Parasitus fucorum* and *Poecilochirus necrophori* (both Acarina), *Allantonema philonthi* n.sp. from *Philonthus fimetarius*, *P. vernalis* and *P. debilis*, *A. matthesi* n.sp. from *Ochthebius* sp., *Parasitylenchus* (*Metaparasitylenchus*) *telmatophili* n.sp. from *Telmatophilus caricis* and *T. typhae*, *P.* (*M.*) *cryptophagi* n.sp. from *Cryptophagus umbratus*, *P.* (*M.*) *mycetophagi* n.sp. from *Mycetophagus piceus*, *P.* (*M.*) *tetropii* n.sp. from *Tetropium castaneum*, *T. fuscum* and *T. gabrieli*, *P.* (*M.*) *strangaliae* n.sp. from *Strangalia maculata* and *S. quadrifasciata*, *P.* (*M.*) *rhizophagi* n.sp. from *Rhizophagus bipustulatus*, *P.* (*M.*) *helmidis* n.sp. from *Helmis maugei*, *Latelmis volkmari* and *Riolus subviolaceus*, *Parasitylenchus* (*Proparasitylenchus*) *platystethi* n.sp. from *Platystethus cornutus*, *P.* (*P.*) *medonis* n.sp. from *Medon ripicola*, *P.* (*P.*) *boopini* n.sp. from

Trogophloeus fuliginosus, *P.* (*P.*) *myrmedoniae* n.sp. from *Zyras lugens*, *P.* (*P.*) *athetae* n.sp. from *Atheta sordida*, *P.* (*P.*) *oxyteli* n.sp. from *Oxytelus complanatus*, *P.* (*P.*) *trogophloei* n.sp. from *Trogophloeus bilineatus*, *Parasitylenchoides anobii* n.sp. from *Anobium pertinax* and *A. striatum*, *P. wichmanni* n.sp. from *Plegaderus caesus* and *P. discisus*, *P. paromali* n.sp. from *Micromalus parallelepipedus*, *P. ditomae* n.sp. from *Ditoma crenata*, *P. paederi* n.sp. from *Paederus litoralis*, *Parasitylenchoides steni* n.sp. from *Stenus biguttatus*, *S. bimaculatus*, *S. binotatus*, *S. pallitarsis* and *S. buphtalmus*, *P. sciodrepae* n.sp. from *Sciodrepa watsoni*, *P. rheocharae* n.sp. from *Aleochara spadicea*, *P. körneri* n.sp. from *Oxytelus tetracarinatus*, *Heterotylenchus bovieni* n.sp. from *Bembidion varium* and *B. obliquum*, *H. wülkeri* n.sp. from *Bembidion articulatum*, *H. stammeri* n.sp. from *Clivina fossor*, *Protylenchus heteroceri* n.sp. from *Heterocerus marginatus* and *H. fenestratus*, *Sphaerulariopsis stammeri* n.g., n.sp. from *Ernobius abietis*. Seven new species are assigned to the Aphelenchoidea and with their insect hosts are as follows: *Peraphelenchus necrophori* n.sp. from *Necrophorus vespillo*, *N. vespilloides* and *N. investigator*, *Entaphelenchus oxyteli* n.sp. from *Oxytelus piceus*, *E. platystethi* n.sp. from *Platystethus cornutus* and *P. arenarius*, *E. bledii* n.sp. from *Bledius opacus*, *E. aliantae* n.sp. from *Atheta incana*, *E. xantholini* n.sp. from *Xantholinus tricolor*, *X. punktulatus* and *X. linearis*, and *E. philonthi* n.sp. from *Philonthus fimetarius*, *P. concinnus* and *P. fulvipes*. Wachek did not classify his genera within the superfamilies for he considered their classification, based on free-living and plant-parasitic forms, to require a review and to be based on a point of view different from the one he followed. Nematodes of the bark beetles are not considered. H.E.W.

428—Pflanzenarzt. Vienna.

a. SCHREIER, O., 1955.—" Die Rübenmüdigkeit." **8** (8), 67–68.
b. BÖHM, O., 1955.—" Lästiges Gewürm." **8** (8), 68–70.

(428a) In this general account of sugar-beet eelworm (*Heterodera schachtii*) the author describes the symptoms of beet sickness and the life-history of the nematode. Control by chemicals is impracticable but damage can be reduced by crop rotation and precautions should be taken to hinder the spread of the pest. M.T.F.

(428b) This is a popular account of eelworm diseases of crops, including sugar-beet and potato eelworms, stem and bulb eelworms and ectoparasitic root eelworms. Control by crop rotation, chemicals and steam sterilization are briefly mentioned. M.T.F.

429—Phytopathology.

a. BALD, J. G. & CHANDLER, P. A., 1955.—" Propagation from scales of treated croft lily bulbs." [Abstract of paper presented at the 37th Annual Meeting of the Pacific Division of the American Phytopathological Society, Pasadena, Calif., June 22–24, 1955.] **45** (12), 693.
b. DEWOLFE, T. A., KLOTZ, L. J. & HASHIMOTO, S., 1955.—" Nematophagus fungi in citrus orchards." [Abstract of paper presented at the 37th Annual Meeting of the American Phytopathological Society, Pasadena, Calif., June 22–24, 1955.] **45** (12), 693.

(429a) It is stated that "as far as could be determined" treatments given to a batch of Croft lily bulbs eliminated pathogenic nematodes from the scales used for subsequent propagation of bulblets. The treatment was curing at 95°F., followed by storage for some weeks at room temperature, a two-day pre-soak in cold water, two hours in water at 115°F. with 1:200 formaldehyde and 24 hours in 1:1,000 Puratized Agricultural spray "7·5 percent tris (2-hydroxyethyl) (phenylmercuri) amonium lactate". M.T.F.

(429b) The authors found nematophagous fungi in a watered wood shavings mulch in a citrus grove in which the practice of mulching plus sprinkler watering had been followed by an increase in growth and fruit production. They suggest that this practice by favouring the increase of nematophagous fungi leads to a reduction of nematodes and improvement in health of the citrus trees. M.T.F.

430—Plant Disease Reporter.

a. OTEIFA, B. A., 1955.—" Nitrogen source of the host nutrition in relation to infection by a root-knot nematode, *Meloidogyne incognita*." **39** (12), 902–903.
b. GOHEEN, A. C. & WILLIAMS, C. F., 1955.—" Seasonal fluctuations in the population of meadow nematodes in the roots of cultivated brambles in North Carolina." **39** (12), 904–905.
c. GOHEEN, A. C., 1955.—" D-D fumigation of soil for the control of parasitic nematodes in strawberries." **39** (12), 906–908.
d. GOHEEN, A. C. & BRAUN, A. J., 1955.—" Some parasitic nematodes associated with blueberry roots." **39** (12), 908.
e. OTEIFA, B. A., 1955.—" Occurrence of the citrus nematode in Egypt." **39** (12), 989.

(430a) In these experiments where the source of nitrogen was either ammonia or nitrate, when lima beans were inoculated with 200 egg masses of *Meloidogyne incognita*, the number of mature females and of egg masses per gramme of root was greater in plants receiving nitrate. Root gall index was also higher in this treatment. Rates of reproduction, however, were equal, indicating that the development within the root tissue was independent of the type of nitrogen ion. Ammonia also decreased the nematode injury which may have been due to the inhibitory effect of ammonium ions on egg hatching. J.B.G.

(430b) Root populations of *Pratylenchus vulnus* in blackberries attained maximum density about 1st June when there was maximum root growth. Populations declined rapidly from this date and remained low throughout the year, building up again when root growth started the following spring. Two trailing varieties of blackberry, Carolina and Earliness, supported smaller populations than four other varieties tested. J.B.G.

(430c) Clay loam at Beltsville was fumigated on 24th April, 1953 with D-D mixture at 30 gallons per acre. The soil contained high populations of *Pratylenchus pratensis* and *P. penetrans* together with some *Meloidogyne hapla* and a few *Hoplolaimus* sp. Strawberry plants, varieties Aroma and Blakemore, were planted out on 2nd June, 1953 on fumigated and unfumigated plots. Some of these plants were nematode-free, others were infested with pratylenchs. In the first year nematode populations were low, in 1954 they had became established on all plots although significantly less so on fumigated ones and in 1955 they had built up and were equal on all plots. The yields of fruit were better on the fumigated plots. J.B.G.

(430d) Nematodes found associated with roots of blueberries from Massachusetts, North Carolina, New Jersey and Maryland include species of the following genera, *Tetylenchus*, *Meloidogyne*, *Xiphinema*, *Trichodorus*, *Helicotylenchus*, *Hoplolaimus* and *Dolichodorus*. *Tetylenchus* sp. was most frequently found and its possible pathogenicity is suggested. J.B.G.

(430e) The citrus root nematode, *Tylenchulus semi-penetrans*, is reported from five-year-old lemon trees, *Citrus limonia*, for the first time in Egypt. J.B.G.

431—Plant Pathology. London.

a. WINSLOW, R. D., 1955.—" The effects of some leguminous crops on the soil population level of pea root eelworm." **4** (3), 86–88.
b. SOUTHEY, J. F., 1955.—" Survey of cereal root eelworm in England and Wales, 1954." **4** (3), 98–102.

(431a) Data are presented showing that of leguminous hosts of *Heterodera göttingiana*, garden pea and vetch increased the eelworm population, but broad bean and lentil did not: of non-hosts, sweet pea considerably reduced population level. The maximum eelworm population which the crop will support is high for peas but low for broad beans and lentils. Broad beans and lentils appeared to have carried few new cysts, although contents of existing cysts were greatly reduced probably due to hatching stimulated by root diffusate. J.B.G.

(431b) [This is essentially the same as a paper appearing in *Nematologica*, 1956, **1**, 64–69. For abstract see Helm. Abs., **25**, No. 26i.]

432—Presse Médicale.

*a. DUPLAY, J., BÉRARD-BADIER, M., COSSA, P. & RANQUE, J., 1955.—"A propos d'un cas de cénurose cérébrale." **63** (30), 625–626.

433—Proceedings of the Alumni Association, Malaya.

a. SANDOSHAM, A. A., 1955.—"A check list of the helminth parasites of man in Malaya with brief notes on their incidence." **8** (4), 258–265.
b. HOEPPLI, R., 1955.—"Imaginary parasites and their role in medicine." 8 (4), 287–300.

(433a) The annotations of this check list of the helminths of man in Malaya include the following items: *Schistostoma spindale* and a cercaria of the *elvae* group (*Cercaria malayi I*) which cause sawah itch among rice cultivators. Few cases of *Fasciolopsis buski* are known; it is endemic but rare in Malayan-reared pigs. The few records of *Fasciola hepatica* in man in Malaya are probably mistaken identifications of *Fasciolopsis buski*. The reported incidence of *Clonorchis sinensis* is probably lower than the actual rate owing to the exclusive use of the salt flotation technique for diagnosis. Eggs of *Hymenolepis nana*, which is seldom reported in hospital returns, were present in nearly 1% of 1,300 stools of patients in Singapore Hospital. Locally bred cattle are lightly infected with *Cysticercus bovis*: *Taenia saginata* is found about a dozen times a year. *Taenia solium* is rare: Malayan-bred pigs are relatively free from *Cysticercus cellulosae* but before the war pigs imported from Bali and Indo-China were heavily infected. Since the war imports have diminished and of 318,575 pigs slaughtered in Singapore in 1954, 90% were locally bred. None of the nine infected carcasses were of local origin. *Trichinella spiralis* is very rare. No infection has been found in several hundred wild caught rodents. *Ascaris lumbricoides* is a common parasite but *Trichuris trichiura* is now less frequent than before the war. Hookworm has also diminished. *Ancylostoma ceylanicum* is rare in man. The creeping eruption occasionally met, especially in Europeans, is probably acquired at bathing sites polluted by dogs infected with *A. caninum* or *A. ceylanicum*. Some other species have been found hitherto only in immigrants but may become endemic, e.g. *Paragonimus westermanii* to which a local melanid species is readily susceptible. R.T.L.

434—Proceedings of the Indian Academy of Sciences. Section B.

a. LAL, M. B. & BAUGH, S. C., 1955.—"Studies in histopathology—effects of the presence of a plagiorchid metacercaria on the tissues of the snail *Vivipara bengalensis* (Lamarck)." **42** (3), 114–122.
b. RAMALINGAM, K., 1955.—"A remarkable organism, *Telegamatrix pellona* gen. et sp.nov. (Monogenea: Diplectaninae) parasitic in an Indian herring." **42** (5), 209–218.
c. LAL, M. B. & PREMVATI, 1955.—"Studies in histopathology—changes induced by a larval monostome in the digestive gland of the snail, *Melanoides tuberculatus* (Müller)." **42** (6), 293–299.

(434a) The histopathological changes caused by the metacercariae of a plagiorchid in the tissues of *Vivipara bengalensis* are described and figured. The infection would possibly reduce the normal elastic function of the mantle. Development of the cysts in the tentacle would adversely affect normal vision and by pressing on the ductus ejaculatorius interfere with its function as an intromittent organ. Cysts in the gill filaments would hamper the snail's normal circulation and respiration. R.T.L.

(434b) Ramalingam describes and figures a new monogenetic trematode from the gills of *Ilisha indica* at Madras. *Telegamatrix pellona* n.g., n.sp. is assigned for the present to the subfamily Diplectaninae but is unique in the possession of a long, flexible, contractile copulatory tentacle: at the tip of the tentacle is a copulatory complex consisting of a distal vaginal collar narrowing to the reniform opening of the vaginal canal, a proximal double penis collar through which projects the fleshy penis and an accessory piece or gubernaculum which regulates the flow of sperm into the penis. In general anatomy, except the position of the ovary behind the testis, the new form resembles *Lamellodiscus*. Of 14 specimens collected, ten were in copula but the union appears only to be temporary. S.W.

(434c) There are four distinct types of cells in the digestive gland of *Melanoides tuberculata* but in specimens infected with a larval monostome these distinctions are lost. The calcium globules within the triangular cells disappear. The columnar cells became squarish and may become a syncitial nucleated mass. All the cells appear full of dark pigment and only a few large globular vacuoles are seen in the infected gland. Where the infection is very heavy the entire gland tissue becomes necrosed and is replaced by the larval trematodes. R.T.L.

435—Proceedings. Soil Science Society of America.

a. ENO, C. F., BLUE, W. G. & GOOD, Jr., J. M., 1955.—" The effect of anhydrous ammonia on nematodes, fungi, bacteria, and nitrification in some Florida soils." **19** (1), 55–58.

(435a) The authors treated field plots by applying anhydrous ammonia through knife-type injectors spaced at 13·5 or 16 inches apart, to a depth of five inches. They extracted nematodes from soil by Christie & Perry's modification of the Baermann method and then broadly identified them. Their data are presented in a series of tables. *In vitro* tests showed that with a concentration of ammonia of 365 p.p.m. or greater, only 0·6% of the nematodes survived the treatment. In the field drastic reduction of nematodes occurred in the retention zone which, however, only extended to about one inch radius. The nematodes met with in the soils were: *Hoplolaimus coronatus*, *Criconemoides* spp., *Trichodorus* spp., *Xiphinema americanum*, *Belonolaimus gracilis*, *Pratylenchus* spp., *Mononchus* spp. and *Dorylaimus*. J.B.G.

436—Public Health. Johannesburg.

a. ANNECKE, D. H. S., 1955.—" Bilharzia in Transvaal." **18** (1), 2–7.

(436a) Annecke has mapped and tabulated the rate of schistosome infection in native children in schools in various parts of Northern Transvaal and of Africans living on European-owned farms and in Native Reserves. The incidence of *Schistosoma mansoni* on the farms was 68·5%, that in the Reserves was 33·4%. In farm children up to four years old *S. mansoni* was present in 78·9% whereas in the Reserves it occurred in only 20%. The monthly rates of infection found in adults of *Physopsis* in the Nelspruit district and of *Planorbis* in the Letaba district are tabulated. No infection was found in young specimens. R.T.L.

437—Publicaciones del Instituto de Biología Aplicada. Barcelona.

a. GADEA, E., 1955.—" Nematodos dulceacuícolas de Galicia." **20**, 77–114. [English summary p. 113.]

(437a) Gadea has studied the nematodes in samples of fresh water from lakes, springs, streams and peat mosses in the province of Galicia in north-west Spain. Samples from a peat moss consisting of *Sphagnum* and *Drosera* with some water circulating were very uniform and contained mainly the four species *Ironus ignavus*, *Monhystera paludicola*, *Actinolaimus macrolaimus* and *Dorylaimus limnophilus*. In a lake overgrown with vegetation the typical forms were *D. limnophilus*, *M. paludicola*, *Trilobus gracilis* and *A. macrolaimus*. Samples from other lakes and from the estuary of the Vigo were heterogeneous. From all the samples taken together 46 species are recorded; 7 are new records for Spain, namely, *Tripyla cornuta*, *Ironus ignavus*, *Xiphinema grandis*, *Achromadora ruricola*, *Chromadorita leuckarti*, *Aphanolaimus aquaticus* and *Theristus dubius*. These are figured. The most abundant species found were *Dorylaimus limnophilus* (16%), *Monhystera paludicola* (15%), *Actinolaimus macrolaimus* (12%), *Ironus ignavus* (8%) and *Dorylaimus stagnalis* (7%). In general the nematode fauna of this part of Galicia is similar to that of the west and north of Europe and differs from that in the greater part of Spain. M.T.F.

438—Publications of the Institute of Marine Science, University of Texas.

a. KORATHA, K. J., 1955.—" Studies on the monogenetic trematodes of the Texas coast. I. Results of a survey of marine fishes at Port Aransas, with a review of Monogenea reported from the Gulf of Mexico and notes on euryhalinity, host-specificity, and relationship of the Remora and the Cobia." **4** (1), 233–249.

b. KORATHA, K. J., 1955.—" Studies on the monogenetic trematodes of the Texas coast. II. Descriptions of species from marine fishes of Port Aransas." **4** (1), 251–278.

(438a) Koratha briefly reviews the records of Monogenea on fish in the Gulf of Mexico before 1954 and lists the 14 species (belonging to seven families and 12 genera) which he collected from 327 fish examined at Port Aransas; 10% of the fish were infested. He discusses euryhalinity and host specificity and considers the parasitological evidence for the relationship of the Echeneidae and Rachycentridae. The results of his survey are summarized in five tables. Of the 14 species he records, eight are new and two are new combinations; these are described in another paper [for abstract see No. 438b below]. S.W.

(438b) In his second paper Koratha describes and illustrates the new species of Monogenea which he collected at Port Aransas and redescribes the known forms. *Dionchus hopkinsi* n.sp. from the gills of *Rachycentron canadus* closely resembles *D. agassizi* but may be easily distinguished from it by its larger size (5·1 mm. long by 800 μ at its greatest width) and different body proportions, its finger-like vitellaria and its larger pair of hooks (160 μ long). *Encotyllabe pricei* n.sp. from the gills of *Scorpaena plumieri* is distinguished from *E. lintonii* by its size and by having the testes at different levels, a shorter hook on the opisthaptor, no small hooks or marginal hooklets, a small ring-like stalk for the pleated membrane of the prohaptor and a well developed shell gland. *Microcotyle scomberomori* n.sp. from the gills of *Scomberomorus maculatus* has a very characteristic cirrus with a spined knob-like anterior end, an anterior neck-like portion with the pointed ends of the oval suckers directed antero-laterally, a narrow pointed opisthaptor with 35 to 40 clamps and the anterior part of the testes on a level with the ovary. *Heteraxine scomberomori* n.sp. from the gills of *S. maculatus* has a characteristic median vagina with a circular anterior end with four or five ridges which project into the lumen and numerous spines within the vaginal tube. *Pseudaxine texana* n.sp. from the gills of *S. maculatus* is closely related to *P. mexicana* but differs in the blunt anterior end, the union of the caeca in the opisthaptor and in the presence of conspicuous transverse striations or ridges on the anterior part, 45 clamps and a single pair of anchors on the opisthaptor. *Diclidophora lintoni* n.sp. from the gills of *Brevoortia gunteri* agrees fairly closely with *Dactylocotyle* sp. from *B. tyrannus* which was drawn but not described by Linton in 1905 and is now assumed to be a synonym of *Diclidophora lintoni*. *D. caudalis* n.sp. from the caudal fin of *Leiostomus xanthurus* differs from *D. macruri* in its shorter peduncles and different haptor measurements and is unique in the genus in its location on the host. *Hexostoma pricei* n.sp. from the gills of *Sarda sarda* is differentiated from all other members of the genus by the variation in size of the suckers on the opisthaptor, the first two pairs being 500 μ by 340 μ, the third pair 460 μ by 340 μ and the fourth 375 μ by 300 μ. *Microcotyle incomparabilis* is transferred to *Pyragraphorus* and *M. macracantha* to *Metamicrocotyle* as new combinations. *Squalonchocotyle tiburonis*, *Protomicrocotyle mirabilis*, *Microcotyle pomatomi* and *Loimos scoliodoni* are redescribed. S.W.

439—Quarterly Journal of Microscopical Science.

a. ONIONS, T. G., 1955.—" The distribution of hatching within the cyst of the potato root eelworm, *Heterodera rostochiensis*." **96** (4), 495–513.

(439a) Cysts of *Heterodera rostochiensis* were stimulated to hatch in potato root diffusate and emerged larvae were removed and counted daily. After hatching had progressed for some time, but not to completion, cysts were fixed in Duboscq-Brasil, processed through alcohol and methyl benzoate celloidin to benzene and embedded in 54°C. paraffin wax. After sectioning at 20 μ the pattern of emergence was studied. Hatching was found to occur sooner at the

periphery of the cyst than nearer the centre although the position of eggs relative to the open neck or vulva had no influence on the distribution of hatching. Although the cyst wall is permeable to the hatching stimulant, it is considered that the oxygen tension gradient within the cyst is of more importance in determining the hatching pattern. J.B.G.

440—Refuah Veterinarith. Jerusalem.

a. WITENBERG, G., 1955.—[Shade on the pasture.] **12** (2), 172–175. [In Hebrew: English summary pp. 255–256.]

(440a) In Israel the recent increase in the use of natural and artificial pastures in addition to stall feeding has increased the risk of helminth infections, e.g. trichostrongylids and metastrongylids previously of little economic importance. *Fasciola hepatica* occurs in the Huleh, Haifa Bay districts and Hadera and may be spread to other marshy areas. Amphistomes and *Schistosoma bovis* now cause economic loss in the Hadera and may become serious as *Bulinus*, the vector of both, is wide-spread in most of the wet regions of the country. R.T.L.

441—Report of the Rothamsted Experimental Station.

a. FENWICK, D. W., 1955.—" Nematology Department." Year 1955, pp. 107–111.
b. FENWICK, D. W., 1955.—"The hatching of cyst-forming nematodes." [A review.] Year 1955, pp. 202–209.

442—Revista Brasileira de Biologia.

a. LOBATO PARAENSE, W. & DESLANDES, N., 1955.—" Studies on *Australorbis centimetralis*. II: Biospecific characterization. III: Generic status." **15** (4), 341–348.
b. VILLELA, G. G. & RIBEIRO, L. P., 1955.—" Hemoglobins of the worm *Tetrameres confusa*." **15** (4), 383–390. [Portuguese summary p. 389.]
c. RUIZ, J. M., 1955.—" Situação sistemática de alguns gênero e espécies da subfamília Planorbinae Pilsbry, 1934 (Mollusca, Planorbidae)." **15** (4), 395–410. [English summary pp. 408–409.]

(442a) A study of the biospecific characters of *Australorbis centimetralis*, *A. glabratus*, and *A. nigricans* leads the authors to conclude that *A. centimetralis* is separated by a clean cut reproductive gap from the other two species thus ensuring their respective identity. After a comparison of *A. centimetralis* with species of *Tropicorbis* it is concluded that it must on morphological grounds remain in *Australorbis*. It is also considered that the fossil genus *Tropicorbis* is of doubtful validity. R.T.L.

(442b) The absorption curve of oxyhaemoglobin from female *Tetrameres confusa* was similar to that of the host although there were slight differences in absorption maxima. The average amount of haemoglobin per worm weighing 75 mg. was 2·8 μg. Although oxygen has a strong affinity for the pigment the evidence for a definite respiratory function is incomplete. When the worms were stored for several days in an ice-box there was no decomposition of the haemoglobin, indicating that it is not a metabolic product. *Tetrameres* haemoglobin was more resistant to alkali denaturation than was the host haemoglobin. Paper electrophoresis indicated that three components were present in the peri-enteric fluid, one similar to the host haemoglobin and all giving a positive benzidine reaction. S.W.

(442c) Ruiz reviews the systematics of the Planorbinae in the light of their anatomy, oecology and conchology. Consideration of the renal ridge, retal crest, intestinal loop, jaw and radula enables the genera to be arranged into two groups, viz., (i) *Planorbis*, *Anisus*, *Armiger* and *Gyraulus* and (ii) *Biomphalaria*, *Australorbis* and probably *Tropicorbis* and *Taphius*. The subgenus *Lateorbis* is suppressed and *Planorbis pallidus*, *P. centimetralis* and *P. nigrilabris* are transferred to *Biomphalaria*. *Australorbis* differs from *Biomphalaria* only in the presence of a renal ridge. A key for the recognition of the principal genera of Planorbinae is based on the male genitalia, type of jaw, form of the marginal teeth of the radula and the presence of a renal ridge. *Taphius* is now a genus inquirendae but as it has priority over the other Planorbinae genera of importance in human parasitology further study of the type species *T. andecolus* is urgently needed. R.T.L.

443—Revista Kuba de Medicina Tropical y Parasitología.

a. BASNUEVO, J. G., BLANCO RABASSA, E., MAÑAS, A. & CASANOVA, R., 1955.—" Cuarenta casos de ascariasis tratados con adipato de piperacina." **11** (1/6), 3–5.
b. BASNUEVO, J. G., 1955.—" Cloroquina y emetina intramuscular en el tratamiento de la amibiasis, la fascioliasis y la clonorchiasis." **11** (1/6), 5–8. [English summary p. 7.]
c. CARDELLE, G. & DÍAZ CARRAL, M. DEL C., 1955.—" Pruebas intradérmicas con extractos parasitarios. Su significación clínica." **11** (1/6), 8–13. [English summary p. 13.]
d. BASNUEVO, J. G., MAÑAS CAO, A. & CASANOVA, R., 1955.—" Un nuevo tratamiento de la ascariasis." **11** (1/6), 14–16.
e. BASNUEVO, J. G., 1955.—" Profilaxis de las enfermedades parasitarias y tropicales más frecuentes en Cuba." **11** (1/6), 18–23.
f. SANTAELLA, R. B., 1955.—" Ascaridiasis y su tratamiento. Complicaciones observadas." **11** (1/6), 23–31.
g. BARONIO, G. F. & CASTELLINI, F., 1955.—" Su alcuni casi di anchilostomiasi duodenale trattati con esilresorcinolo-tetracloroetilene-olio di chenopodio." **11** (1/6), 31–33. [English summary p. 33.]
h. BASNUEVO, J. G., 1955.—" Algo más sobre la mezcla hexilresorcinol-tetracloroetileno en el tratamiento de la taeniasis, la uncinariasis y la tricocefaliasis." **11** (1/6), 34–35.
i. BASNUEVO, J. G., LÓPEZ FERNÁNDEZ, O. & AGUIRRE MEDRANO, O., 1955.—" Tumoración abdominal por *Ascaris lumbricoides*. Estudio parasitológico. Caso tratado con piperacina." **11** (1/6), 35–36.
j. BASNUEVO, J. G. & MAÑAS CAO, A., 1955.—" Obstrucción intestinal incipiente por *Ascaris lumbricoides*, tratada con piperacina. Estudio parasitológico." **11** (1/6), 36.
k. BASNUEVO, J. G. & MAÑAS CAO, A., 1955.—" Oclusión intestinal por Ascaris. Estudio parasitológico. Caso tratado con piperacina." **11** (1/6), 37.
l. BASNUEVO, J. G., ESBER, J. & PÉREZ GANDARILLA, M., 1955.—" Obstrucción intestinal por Ascaris. Caso fatal." **11** (1/6), 37.
m. BASNUEVO, J. G. & CASANOVA, R., 1955.—" Síndrome sub-oclusivo por Ascaris. Estudio parasitológico. Caso tratado con adipato de piperacina." **11** (1/6), 37–38.

(443a) Thirty-three out of 40 Ascaris infections were cured by piperazine adipate tablets. The dosage rate generally employed was 4 gm. per day for seven days or, in children under eight, 0·5 gm. daily per year of age for seven days. One patient expelled 652 worms. Dr. M. Balais successfully treated a case of cutaneous larva migrans with the local application of ethyl chloride and the administration of a syrup containing piperazine hexahydrate for seven days. Unfertilized Ascaris eggs are not recovered by many concentration techniques but can be collected successfully when a solution containing cane sugar 500 gm., pure glycerin 100 c.c., pure formalin 20 c.c., acetic acid 5 c.c. and water 500 c.c., is used. M.MCK.

(443b) Basnuevo reviews the dosage rates and methods of administration of emetine hydrochloride and chloroquine diphosphate for *Fasciola hepatica* and *Clonorchis sinensis* infections. For the treatment of *F. hepatica* a mixture containing 0·025 gm. of emetine hydrochloride and 0·25 gm. of chloroquine disphosphate in 5 c.c. of water can be injected intramuscularly for ten consecutive days. Each day adults receive 2–5 c.c. and children 1 c.c. for every three years of age. Basnuevo believes that using this mixture some cases of *F. hepatica* can be cured with a smaller dose of emetine than usual, i.e. 0·125 mg. per lb. body-weight as a total dose instead of 0·5 mg. per kg. body-weight. M.MCK.

(443c) Antigens were prepared from *Ascaris lumbricoides*, *Enterobius vermicularis*, *Necator americanus*, *Ancylostoma caninum*, *Toxocara canis*, *Trichuris trichiura*, *Taenia saginata* and *Taenia echinococcus*. One gramme of powdered worm and 0·5 c.c. of phenic acid were dissolved in 100 c.c. of 8·5 per thousand saline; from this, 1 c.c. was taken and diluted in further 100 c.c. of saline with 0·2 c.c. of phenol. Most of the antigens were injected subcutaneously into each of 113 children and three adults. Some of the results are given below. Cases with *Taenia saginata* or *E. vermicularis* only, were negative to all tests; six of 23 carriers of *Trichuris trichiura* only were positive to its antigen; six of 12 persons with only Ascaris infections were positive to the Ascaris antigen. Reactions took place to the antigens of *Ascaris*, *Toxocara*, *Necator* and *Ancylostoma* in children apparently free from these parasites. Two of three patients with creeping eruption were positive to the antigens of *Ascaris*, *Toxocara* and

Ancylostoma and one reacted slightly to that of *Trichuris*; the third patient, aged five months, was negative to all the tests. All of five cases of visceral larva migrans were positive for *Toxocara*. It is concluded that only those worms which have a tissue phase in their development produce skin sensitization. M.MCK.

(443d) For the treatment of Ascaris infections Basnuevo *et al.* administer piperazine adipate or hexahydrate daily at the rate of 0·5 gm. per year of age, or 4 gm. at eight years of age or over, for seven days. In cases of intestinal obstruction 0·75 gm. can be administered per year of age up to a maximum dose of 4 gm. on the first day. This is followed by a dosage rate of 0·5 gm. for six days. Uncured patients are treated again after a week's rest. M.MCK.

(443e) Basnuevo outlines general and personal prophylactic measures and anthelmintic treatments for the common intestinal helminth infections of man in Cuba. These are *Trichuris trichiura*, *Ascaris lumbricoides*, *Necator americanus*, *Ancylostoma duodenale*, *Enterobius vermicularis*, *Strongyloides stercoralis*, *Taenia saginata*, *Hymenolepis nana*, *H. diminuta*, *Dipylidium caninum*, *Inermicapsifer cubensis*, *Fasciola hepatica* and *Clonorchis sinensis*. M.MCK.

(443g) Four patients with ancylostomiasis were treated with capsules containing 0·1 gm. hexylresorcinol, 0·65 gm. tetrachlorethylene, 0·038 gm. chenopodium oil and medicinal chlorophyll, pistachio nut oil and gelatin. Ten capsules were administered on an empty stomach at intervals of five minutes. Two of the patients had to be treated a second time. M.MCK.

(443h) Basnuevo, who previously had administered a hexylresorcinol-tetrachlorethylene mixture in a single dose for *Taenia*, hookworm and *Trichuris* infections, now gives a mixture at the rate of 0·15 gm. of hexylresorcinol and 0·6 c.c. of tetrachlorethylene per day for ten days in capsule form or in syrup, orange or skimmed milk. Over 90% of the *Taenia saginata* cases were cured. Hookworm cases, similarly treated, subsequently received iron and cobalt gluconate for 10 to 20 days. Some light infections of *Trichuris* were also cured. The incidence of *Ancylostoma* in Pinar del Rio, in Cuba, has increased in the last three years. M.MCK.

444—Revista Médica do Sul de Minas.

a. FROTA, M., 1955.—" A enteroparasitose humana e sua prevalência no Sul de Minas Gerais. Estudos estatísticos baseados em 13,000 exames de fezes, compreendendo um período de 20 anos." **1** (1), 40–75. [English summary p. 71.]

(444a) Frota gives the results of faecal examinations conducted on 13,000 patients, most of whom had digestive disturbances, from the south of Minas Gerais, Brazil, from 1933 to 1954. By far the commonest helminths were Ascaris and hookworm, which occurred in 12·96% and 11·11% respectively. M.MCK.

445—Rhodesia Agricultural Journal.

a. MARTIN, G. C., 1955.—" Plant and soil nematodes of the Federation of Rhodesia and Nyasaland. Preliminary investigations. Nematodes catalogued under hosts or associated plants." **52** (4), 346–361.

(445a) Martin gives a list of the hosts of root-knot nematodes (*Meloidogyne javanica*, *M. incognita* var. *acrita* and *M. hapla*) so far found in the area with indications of the degree of infestation. Root-knot diseased tobacco contained *M. javanica* in 98·75% of cases and *M. incognita* var. *acrita* in the remainder. A list of nematodes, known or suspected to be plant parasites, found in the area is given together with the names of plants with which they were found associated. M.T.F.

446—Rhodesian Tobacco.

a. DAULTON, R. A. C., 1955.—" Progress report on eelworm control experiments." No. 11, pp. 21–24.

(446a) The climatic conditions during the tobacco growing season in Rhodesia are well suited to maximum activity of all plant-parasitic nematodes. By far the commonest species in tobacco in Rhodesia is *Meloidogyne javanica*. In pot tests on four species of *Crotalaria*, the commercially grown *C. juncea* supported a moderate root-knot infection, *C. intermedia* was more resistant, *C. paulina* and *C. spectabilis* showed a high degree of resistance. In *C. spectabilis* the larvae were unable to grow and finally died. Although the *Crotalaria* strains do not appear to build up populations in the soil, these and other legumes should not precede tobacco as the nitrogen produced may affect the quality of the tobacco leaf. While grasses have proved satisfactory as rotation crops, some may maintain an existing infection. Of those tested Teff grass carried the highest root-knot infection. The benefits of ploughing-in a good grass ley may greatly outweigh nematode damage. Moreover, grass leys smother out susceptible indigenous weeds during the summer. Mexican Marigold, *Tagetes minuta*, was the only weed not parasitized sufficiently to build up the eelworm population. Other pot experiments showed that cotton and peanuts were the most suitable crops for use in anti-root-knot rotations. The effect of various three-year rotations and the yield of Flue-cured tobacco in 1954–55 are tabulated. Continuous growing of tobacco gave the lowest yield, while cotton-peanuts, velvet beans-cotton and two years of weeping lovegrass gave very significant decrease in infection with increased yields. As green manuring crops, Sunnhemp, velvet beans and munga, although highly susceptible, tended to counteract the nematode damage by increasing the soil fertility. It is estimated that yields decreased by approximately 20 lb. per acre for each increase of 1% in infection. A combination of several practices will give a higher yield and better quality crops than any single practice. R.T.L.

447—Rural Research in C.S.I.R.O. Melbourne.

a. ANON., 1955.—" The pattern of seasonal changes in worm infestation of sheep provides a basis for strategic drenching in the winter-rainfall regions." No. 11, pp. 23–26.
b. ANON., 1955.—" High-quality pastures reduce worm infestation in sheep." No. 11, pp. 26–28.

448—Semana Médica. Buenos Aires.

a. BONELLI, V. D., 1955.—" Incidencia de *Enterobius vermicularis* en el apéndice vermiforme de niños." **106** (21), 735–736, 756. [English summary p. 756.]
b. VIANNA MARTINS, A. & VIANNA MARTINS, J., 1955.—" Acción antihelmíntica de la piperacina." **107** (2), 86–89.

(448a) The examination of appendices removed from 130 children under 14 years of age in Argentina showed *Enterobius* adults in 29, *Enterobius* ova in four, *Hymenolepis nana* ova in one and *Taenia saginata* ova in one. M.MCK.

(448b) Piperazine hydrate was tested against eight helminth infections in man. It was given in an aromatic drink containing 500 mg. of piperazine per 4 ml. of liquid. Dosages were of about 50 mg. to 70 mg. per kg. body-weight daily for seven days. Seven out of nine cases of Enterobius were cured and a second treatment cured the remaining two. Eighteen out of 19 Ascaris cases became negative. The action of a more intense treatment on *Strongyloides stercoralis* was inconclusive. *Necator americanus*, *Schistosoma mansoni*, *Trichuris trichiura*, *Taenia* sp. and *Hymenolepis nana* were seemingly unaffected. M.MCK.

449—Shikoku Acta Medica.

a. YAMAGUCHI, T., TOYODA, H. & MATSUO, E., 1955.—[Experimental infestation on dog with *Gnathostoma spinigerum* larvae obtained from second intermediate host, *Ophicephalus argus* Cantor.] **6** (3), 111–113. [In Japanese: English summary p. 111.]

(449a) Unencysted gnathostome larvae from the fresh-water fish *Ophicephalus argus*

from Kagawa Prefecture, Japan, were inoculated into the abdominal cavity of a healthy dog. Two adult males of *Gnathostoma spinigerum* were found 119 days after infection by sectioning nodules in the stomach wall. M.MCK.

450—Smithsonian Miscellaneous Collections.

a. DALMAT, H. T., 1955.—" The black flies (Diptera, Simuliidae) of Guatemala and their role as vectors of onchocerciasis." **125** (1), vii+425 pp.

(450a) This fine monograph deals exhaustively with the taxonomy, life-history, oecology, epidemiology and distribution of the Simuliidae of Guatemala and their role in the transmission of onchocerciasis. The work is illustrated by 44 plates and contains many tables and charts. There are 104 titles in the list of references. *Simulium ochraceum* is the most important and efficient intermediary, but *S. metallicum* is a good secondary vector while *S. callidum* plays only an insignificant role. In the onchocerciasis area of Yepocapa 12% of the horses and cattle have microfilariae in the skin which are superficially similar to those of *O. volvulus*. In this area *S. exiguum* is the dominant human biter below the altitude of 2,500 feet, but elsewhere *S. haematopotum* replaces *S. ochraceum* in importance. In the almost inaccessible zones of onchocerciasis in Huehuetenango *S. ochraceum* is completely absent from some areas and is apparently replaced by *S. veracruzanum*. Infection with *Onchocerca volvulus* reduces the flight capacity and the life span and is the cause of heavy mortality among the flies. R.T.L.

451—Soil Science.

a. SLEETH, B. & REYNOLDS, H. W., 1955.—" Root-knot nematode infestation as influenced by soil texture." **80** (6), 459–461.

(451a) Observing that root-knot disease quickly became severe on the loamy sand of the Yuma Mesa in the south-west of Arizona while in the nearby Yuma Valley where the soil is a clay loam no trouble developed in 20 years' cultivation under irrigation, the authors set up an experiment using the two types of soil separately and mixed in various proportions. The soil was sterilized and then inoculated with *Meloidogyne javanica* and *Sesbania exaltata* was sown in the pots. After ten weeks the heights of the plants and their relative root-knot indices showed that root-knot disease was much more severe in the loamy sand and the mixtures containing a high proportion of this soil than in the clay loam from the Yuma Valley. It is suggested that the root-knot nematode hazard in a given soil could be determined by making a physical analysis of the soil and a detailed soil survey map would indicate where root-knot would be a serious hazard to crops. M.T.F.

452—Tidsskrift for Planteavl.

a. ANON., 1955.—" Plantesygdomme i Danmark 1953." **59** (3), 369–432. [English summary pp. 418–432.]

b. MYGIND, H., 1955.—" Kartoffelålens forekomst i Danmark. Fortsatte undersøgelser 1954." **59** (3), 548–552. [English summary p. 552.]

(452a) Attacks by *Heterodera major* were numerous on cereal crops but the damage was often less than expected. Some heavy attacks by *Heterodera schachtii* on mangolds and beets were reported. *Heterodera rostochiensis* is extremely rare where a reasonable crop rotation is applied but infestations are very common in gardens and allotments. *Ditylenchus destructor* was found to attack potatoes in a field in 1952 and infestations were found in the same field in 1953. *Ditylenchus dipsaci* was very common in fields of red clover, white clover and lucerne, but the weather conditions favoured the growth of the crops and the damage was not so severe. An attack by this nematode was found in rye, for the first time since 1910. Onions, *Primula* and young carnation plants were found to be attacked on different places. S.B.

(452b) In 1954 the examination of soil samples for cysts of *Heterodera rostochiensis* was continued. This nematode up to now is not a danger for the ordinary growing of potatoes but there is a risk for the nematode to be spread from gardens etc. which may be very heavily infested. S.B.

453—Tijdschrift over Plantenziekten.

a. BIJLOO, J. D., 1955.—" Proeven ter bestrijding van *Heterodera rostochiensis* door het wassen en ontsmetten van aardappelen." **61** (2), 47–51. [English summary p. 51.]
b. SEINHORST, J. W., 1955.—" Een eenvoudige methode voor het afscheiden van aaltjes uit grond." **61** (6), 188–190. [English summary p. 190.]

(453a) Bijloo found that potatoes grown in sand or sandy loam could be freed from soil and cysts of *Heterodera rostochiensis* in a potato washing machine but heavy clay could not be completely removed. Cysts placed in sacks of potatoes were killed after immersion in a solution of 0·5% Aardisan for one minute and keeping moist for seven hours. Only slight retardation of growth was caused to the potato variety Bintje but Eertsteling and Libertas were more severely damaged. Other treatments with Aardisan which killed cysts were injurious to potatoes and Aaventa proved phytotoxic for use as a tuber disinfectant. M.T.F.

(453b) Seinhorst describes a technique for collecting eelworms from soil. A 500 gm. sample of soil is mixed with water in a litre conical flask (A) fitted with a wide-mouthed small funnel. The whole is filled with water and inverted in a second conical flask (B) full of water. At the end of ten minutes the flasks are separated, the first (A) allowed to sediment into a beaker of water (C), the second (B) into a similar beaker (D). After a further ten minutes (A) is removed from (C) and (B) from (D) and (B) is allowed to sediment for a third period of ten minutes into (C). The contents of both flasks are sieved through 50 μ mesh sieves and those of (C) through 100 μ mesh sieves. (D) contains only the largest soil particles and almost no nematodes; it is discarded. J.B.G.

454—Trädgårdstidningen.

a. AHLBERG, O., 1955.—" Se upp med potatisålen—en fara för potatisodlingen." **27** (4), 18, 28–29.

(454a) Ahlberg gives a brief description of the nematode attacks on potatoes and points out that it is important that potato seed is grown in areas where the potato nematode is not known. S.B.

455—Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR.

a. GVOZDEV, E. V., 1955.—[Helminth parasites of pheasants.] **3**, 54–66. [In Russian.]
b. GVOZDEV, E. V., 1955.—[The helminth fauna of *Lyrurus tetrix* in Kazakhstan.] **3**, 67–72. [In Russian.]
c. SOKOLOVA, I. B., 1955.—[An analysis of the helminth fauna of wild ruminants in Kazakhstan.] **3**, 73–100. [In Russian.]
d. BONDAREVA, V. I., 1955.—[The role of domestic and wild carnivores in the epidemiology and epizootiology of larval cestode diseases. (Note II). Cestode fauna of wolves.] **3**, 101–104. [In Russian.]
e. BONDAREVA, V. I., 1955.—[The comparative susceptibility of dogs used for various purposes to cestode infections.] **3**, 105–112. [In Russian.]
f. BOEV, S. N. & ANDREEVA, N. K., 1955.—[The morphology of the lungworm of ruminants, *Muellerius capillaris* (Mueller, 1889).] **3**, 113–117. [In Russian.]
g. AGAPOVA, A. I., 1955.—[*Brachylecithum rodentini*—a new parasite in the liver of rodents.] **3**, 118–120. [In Russian.]
h. ULYANOV, S. D., 1955.—[Comparative study of the methods of application of phenothiazine as shown by the effect on strongylosis in sheep.] **3**, 121–139. [In Russian.]

(455a) Gvozdev gives short notes for each of 18 helminth species found in *Phasianus colchicus mongolicus* from the Alma-Ata region. 82·6% of 138 pheasants were infected.

Postharmostomum gallinum, *Leucochloridium insigne*, *Echinoparyphium vestsibiricum*, *Prosthogonimus cuneatus*, *Tetrameres timopheevoi*, *Raillietina graeca* and *Mediorhynchus micracanthus* were new for this host. *Prosthogonimus karausiaki*, originally reported by Layman, 1926 from one specimen, is redescribed. 36 helminth species are listed for pheasants in Russia. G.I.P.

(455b) Eleven helminth species are recorded from *Lyrurus tetrix mongolicus* and *L. tetrix viridanus* from around Kazakhstan. The helminth fauna of *L. tetrix* from various regions of Russia is compared. G.I.P.

(455c) From examinations of seven species of ruminants and from data in the literature, Sokolova lists 57 helminth species for 11 wild ruminants in Kazakhstan. She shortly discusses the specificity of these species, their pathological significance, the possibility of mutual infections between wild and domestic ruminants, and the existence of natural centres of helminth infections common to man and farm animals in Kazakhstan. G.I.P.

(455d) Of twelve wolves from four areas of Kazakhstan where larval cestode infections of sheep and cattle were frequent, seven were infected with *Mesocestoides lineatus*, four with *Taenia pisiformis*, two with *T. hydatigena* and one each with *Multiceps multiceps* and *Echinococcus granulosus*. The significance of wolves in spreading these infections varies in different areas. In South Kazakhstan they are less important than dogs. G.I.P.

(455e) The faeces of 256 dogs treated with arecolin were examined for cestodes. The most frequently infected (65 of 122) were dogs from sheep farms, while 14 of 42 dogs from dairy farms and 41 of 92 dogs from populated areas were infected. The most frequent infection in dogs from sheep and cattle farms was *Taenia hydatigena* (38·5% and 19%). In dogs from populated areas it was *Dipylidium caninum* (29·3%). The highest *Multiceps multiceps* and *Echinococcus* infections occurred in sheep-dogs (9·8%). G.I.P.

(455f) A detailed description is given of the tail of the male of *Muellerius capillaris* including the telamon which has not been previously described. The telamon is well developed and has a basal and a transverse plate but ventral and lateral plates are absent. The basal plate comprises two long narrow rods, not connected with one another, reaching from the dorsal ray to the ventral rays. The transverse plate branches anteriorly at the level of the ventral rays into two fairly broad processes and at its distal end demarcates the cloaca anteriorly. G.I.P.

(455g) *Brachylecithum rodentini* n.sp., described and figured from *Clethrionomys rufocanus* in Kazakhstan, is nearest to *B. filum* but in *B. filum* the testes are 0·13 × 0·17–0·18 mm. and the length of the vitelline glands is 1·28 mm. (right) and 1·32 mm. (left), while in *B. rodentini* the testes are 0·256–0·322 × 0·381–0·437 mm. and the vitellaria are 0·644–0·690 mm. G.I.P.

(455h) In an experiment lasting from March to August, various methods of dosing with phenothiazine were compared in sheep and lambs with strongyles. Using (i) a single dose of 0·5 gm. per kg. body-weight plus a (1:9) phenothiazine-salt mixture daily, (ii) phenothiazine-salt mixture daily and (iii) the mixture every second day, no eggs were found by Stoll's method in the faeces by August. The last was the best method as it required only half the amount of phenothiazine per sheep and was simpler to use. Other methods tried were feeding with the mixture for 3, 5 and 7-day periods, interrupted by the same time periods. With these treatments the infection was lowered but not fully eliminated. Lastly, when a single dose of 0·5 gm. per kg. was given, there was only a temporary reduction in the number of eggs. The control group received salt alone. Using the third method the beneficial effect on the host, e.g. increase in weight and wool production as compared with the controls, was only slightly less than that obtained with methods (i) and (ii). G.I.P.

456—University of California Publications in Zoology.

a. ALLEN, M. W., 1955.—" A review of the nematode genus *Tylenchorhynchus*." **61**, 129–165.

(456a) The type of the genus *Tylenchorhynchus* is now *T. cylindricus* Cobb, 1913 since this species is no longer a synonym of *T. dubius*. Thirty-seven species are briefly described and figured, among them being 22 new to science. These are: *T. acutus*, *T. affinis*, *T. alpinus*, *T. brevidens*, *T. capitatus*, *T. clarus*, *T. conicus*, *T. eremicolus*, *T. grandis*, *T. latus*, *T. leptus*, *T. lineatus*, *T. macrodens*, *T. maximus*, *T. nanus*, *T. nothus*, *T. nudus*, *T. obscurus*, *T. ornatus*, *T. parvus*, *T. striatus* and *T. superbus*. J.B.G.

457—Verslagen en Mededelingen van de Plantenziektenkundige Dienst te Wageningen.

a. OOSTENBRINK, M., 1955.—" Over de waardplanten van het bietencystenaaltje, *Heterodera schachtii* Schmidt." No. 127, pp. 186–193. [English summary pp. 191–192.]

b. KOKS, P. P. & OOSTENBRINK, M., 1955.—" Oude en nieuwe meldingen van aantasting door wortelknobbelaaltjes, *Meloidogyne* spp." No. 127, pp. 228–230. [English summary p. 230.]

c. OOSTENBRINK, M., 1955.—" Nematologische waarnemingen. I. Verschillende *Meloidogyne*-soorten in Nederland." No. 127, pp. 231–234. [English summary pp. 233–234.]

d. OOSTENBRINK, M., 1955.—" Nematologische waarnemingen. II. *Aphelenchoides fragariae* (Ritzema Bos, 1891) Christie, 1932 in *Lilium regale* Wils., *L. henryi* Bak., *L. sulphurgale* Wallace en in de bollen van *L. pumilum* D.C." No. 127, pp. 235–237. [English summary pp. 236–237.]

e. OOSTENBRINK, M., 1955.—" Nematologische waarnemingen. III. Aantasting door *Ditylenchus dipsaci* (Kühn) Filipjev, 1936 van aartsengelwortel, *Angelica archangelica* L. en vuurpijl, *Tritoma* hybr. var. Royal Standard." No. 127, pp. 237–238. [English summary p. 238.]

f. OOSTENBRINK, M., 1955.—" Nematologische waarnemingen. IV. *Heterodera carotae* Jones 1950 op peen, *Daucus carota* L." No. 127, pp. 238–242. [English summary p. 241.]

(457a) In host trials of Dutch populations of *Heterodera schachtii* mature cysts were found on plants in the families Chenopodiaceae, Cruciferae, Polygonaceae, Caryophyllaceae, Amaranthaceae, Portulacaceae and Leguminosae. Slight differences between the host ranges of Dutch and other populations may be due to differences in the host plants or the nematode populations. *Solanum nigrum* and *Galeopsis tetrahit* were not hosts but a few cysts were produced on *Polygonum convolvulus* L., *Sesbania exaltata* (Ref.) Rydb. and *Vigna sinensis* Endl., of which the first two are new host records for *H. schachtii*. Other new host records are: *Arabis arenosa* Scop., *A. turrita* L., *Aubrietia columnea* Guss., *Barbarea praecox* (Sm.) R. Br. (=*B. verna* (Mill.) Aschers), *Brassica cernua* Thbg., *Cardamine impatiens* L., *Cheiranthus alpinus* L., *Rapistrum perenne* (L.) All., *Rumex acetosella* L., *R. patientia* L., *Dianthus barbatus* L. and *D. plumarius* L. The relative efficiency of the plants as hosts was not determined and in some genera, e.g. *Chenopodium*, some species are good hosts while others are non-hosts. The number of new cysts as a percentage of the number of larvae used in inoculation exceeded 50% in two cases and was between 20% and 30% in three others. The monocyst technique proved too inconsistent for quantitative studies. M.T.F.

(457b) After summarizing the records of root-knot nematodes found in Holland from 1900 onwards, the authors give a list of 40 plants found attacked during the period 1950 to 1954. Of these the following are new host records: *Levisticum officinale* Koch, *Hacquetia* sp., *Cimicifuga racemosa* (L.) Nutt., *Incarvillea* sp., *Buphthalmum salicifolium* L., *Cereus peruvianus* Haw. var. *monstrosus*, *Espostoa lanata* Britt. & Rose, *Lathyrus* sp., *Achimenes* sp., *Nertera* sp., *Sinningia* sp. and *Leontopodium alpinum* Cass. [There is no indication as to the species of *Meloidogyne* concerned.] M.T.F.

(457c) Five species of *Meloidogyne* are recorded in the Netherlands. *M. incognita*, *M. arenaria* and *M. javanica* occur in green-houses and *M. hapla* out-of-doors on legumes and other crops and sometimes in green-houses. The fifth species is undescribed and forms medium sized galls on *Euphorbia fulgens* Karw. under glass. Galled potato tubers were infested with *M. arenaria*. *M. hapla* occurs rather generally in the field and has been found on

Artemisia maritima, potato and beet. *Lycopersicum peruvianum* was infested when growing in soil containing *M. hapla*. M.T.F.

(457d) Oostenbrink describes the symptoms of attack by *Aphelenchoides fragariae* on *Lilium regale*, *L. henryi* and *L. sulphurgale*. The plants grew poorly and leaves, growing points, flower buds and fruits became brown and died. The bulbs of *L. pumilum* were found to contain large numbers of *A. fragariae*. M.T.F.

(457e) Attack by *Ditylenchus dipsaci* on *Angelica archangelica* is recorded and figured for the first time. It followed attack on rye the previous year. The angelica grew poorly in patches where the plants yellowed and had rot of the tap root. A similar attack occurred on *Tritoma* [*Kniphofia*] var. Royal Standard. J.B.G.

(457f) A disease of carrots in the Netherlands was found to be closely associated with heavy infestations of *Heterodera carotae*. The Dutch population is compared with specimens from the type locality in England and the male is partly redescribed. It has a high lip region with seven to eight annules and the spicules have truncate tips with three small teeth. The larval lip region has about five annules. The size, shape and colour of the cysts distinguish *H. carotae* from most other species of *Heterodera*. It differs from *H. cruciferae* in having longer and more slender larvae with a higher lip and in the males having a high lip with seven to eight annules as compared with about six in *H. cruciferae*. M.T.F.

458—Veterinaria. Sarajevo.

a. RUKAVINA, J., 1955.—" Aktuelni problemi u suzbijanju invazionih bolesti." [Problems of present interest concerning control of invasive diseases.] **4** (4), 657–662.

459—Veterinarski Arhiv.

a. RICHTER, S., 1955.—" Entoparasitska fauna zeca (*Lepus europaeus* Pall.) u NR Hrvatskoj." **25** (9/10), 258–268. [English & German summaries pp. 265–268.]

(459a) 110 shot hares from various districts of Croatia and faecal samples from 100 living hares, were examined for parasites. Of the eleven helminth species found the most frequent were *Trichostrongylus retortaeformis* (in 62·7% of the hares) and *Trichuris leporis* (in 54·5%). A species of *Paranoplocephala* not identifiable with any of the known species, and specimens, probably *Protostrongylus unciphorus* (Railliet & Henry, 1907) but disagreeing somewhat with the original description, are described from the island of Brioni. G.I.P.

460—Vie et Milieu. Paris.

a. CHABAUD, A. G. & CAMPANA-ROUGET, Y., 1955.—" Helminthes de la région de Banyuls. I. Nematodes parasites d'amphibiens." **6** (1), 83–92.
b. CHABAUD, A. G. & CHOQUET, M. T., 1955.—" Helminthes de la région de Banyuls. II. Deux filaires parasites d'oiseaux." **6** (1), 93–100.

(460a) Among the nematodes collected by Chabaud & Campana-Rouget from amphibians in the Banyuls region, three are of particular interest. *Cosmocerca banyulensis* n.sp., from the rectum of *Rana ridibunda*, is very small and slender (970 μ long by 50 μ broad) and is characterized by the presence of a cuticular collar or flange commencing just behind the cloaca and extending to the border of the last pair of cloacal papillae. Nematodes from the stomach and duodenum of *R. ridibunda* agreed well with Seurat's description of *Porrocaecum numidicum* and Khalil's *Amplicaecum brumpti*, the only difference from Seurat's species being the presence of tiny interlabia: as these appear to be present in his drawing the material is identified as *Amplicaecum numidicum* n.comb. with *P. numidicum*, *A. brumpti* and *Angusticaecum numidicum* as synonyms. Two males and one female collected from the gut of *Alytes obstetricans* were, except for their very small size, identical with the redescription of *Oxysomatium brevicaudatum* by Travassos; the authors relate this to the small size of the host. Other nematodes collected were: *Icosiella neglecta*, *Rhabdias bufonis* and *Cosmocerca ornata*. S.W.

(460b) Chabaud & Choquet describe for the first time the structure of the head and female genital apparatus in *Aprocta turgida*. The cephalic papillae are close to the amphids and arranged in a rectangle, not a square as is usual in filariae with rounded heads. The female genital apparatus is amphidelphic in Seurat's sense and opisthodelphic in Chitwood's sense. The two uteri join 400 μ behind the vulva and pass directly into the vestibule. The egg-shell is very thick (about 5 μ) and the eggs measure 47–50 $\mu \times$ 22–25 μ. *Filaria marcinowskyi* was described by Skryabin and is the adult of *F. ardeae* Nawrotzky, 1914; for this Lyubimov created *Pharyngosetaria* in 1937: material of the same species was collected from *Egretta garzetta*, and on the law of priority is named *Pharyngosetaria ardeae* n.comb. *P. butoridi* and *Lemdana urbaini* are considered to be synonyms of *P. ardeae*. The head is described in detail; the morphology, particularly the length of the left spicule, in the specimens from *E. garzetta* is intermediate between that of the specimens from large hosts (*Ardea cinerea*) and that of specimens from small Ardeiformes. S.W.

461—West Indian Medical Journal.

a. FLOCH, H., 1955.—" Intradermal reactions with filaria antigens." **4** (1), 45–48.

(461a) [This is an English version of a paper which appeared in *Arch. Inst. Pasteur Guyane Francaise*, 1954, XV Année, No. 332. For abstract see Helm. Abs., **23**, No. 364b.]

462—Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz.

a. OOSTENBRINK, M., 1955.—" Bodenmüdigkeit und Nematoden." **62** (5), 337–346. [English summary.]

(462a) Following a brief review of damage caused to vegetable and field crops by migratory root eelworms, particularly *Pratylenchus* spp., the author gives some results of investigations of the effects of these nematodes in tree nurseries and orchards. Numbers of pratylenchs were greater in those areas where growth was poor than where it was good. Apple seedlings grown in sterilized soil inoculated with *Pratylenchus penetrans* were much shorter after 200 days' growth than those in uninoculated soil, and very large numbers of the nematodes were recovered from the soil and roots. Soil fumigation with D-D mixture or heating of the soil to 60°C. killed the nematodes and gave normal growth of nursery stock. Reference is made to the literature on the attack of woody perennials by migratory nematode parasites. The important effect of crop rotations on the population levels of *Pratylenchus* spp. is illustrated in a table and it is pointed out that crop rotations are of primary importance in the control of soil sickness caused by migratory root eelworms. M.T.F.

463—Zeitschrift für Tropenmedizin und Parasitologie.

a. GÖNNERT, R. & VOGEL, H., 1955.—" Über die Abhängigkeit des Therapieerfolges von Wirts- und Parasitenstamm bei der experimentellen Schistosomiasis." **6** (2), 193–198. [English summary p. 197.]
b. BOECKER, H. & ERHARDT, A., 1955.—" Chemotherapeutische Untersuchungen an den natürlichen Oxyureninfektionen der Maus zur Testierung von Oxyurenmitteln." **6** (2), 198–206. [English summary p. 205.]
c. GERMER, W. D., 1955.—" Differentialdiagnose und Pathogenese der extrapulmonalen Paragonimiasis." **6** (2), 206–212. [English summary p. 212.]
d. KUHLOW, F., 1955.—" Untersuchungen über die Entwicklung des Breiten Bandwurmes (*Diphyllobothrium latum*)." **6** (2), 213–225. [English summary p. 224.]
e. GÖNNERT, R., 1955.—" Schistosomiasis-Studien. III. Über die Einwirkungen von Miracil D auf *Schistosoma mansoni* im Mäuseversuch und die Verteilung des Pigmentes in der Wirtsleber." **6** (3), 257–279. [English summary p. 332.]
f. GÖNNERT, R., 1955.—" Schistosomiasis-Studien. IV. Zur Pathologie der Schistosomiasis der Maus." **6** (3), 279–336. [English summary pp. 332–333.]

(463a) Gönnert & Vogel have carried out experiments with different *Schistosoma mansoni* strains and varying strains of mice in order to determine the effect on treatment with miracil-D. They found that the Egyptian strain of *S. mansoni* was more resistant to treatment than the

Liberian strain: a dose of 350 mg. per kg. body-weight was 75% to 97% successful against the former and 92% to 99·5% against the latter. They also found that in different strains of mice the effect of treatment varied, and that the action of miracil-D is more effective in the presence of a heavy infection. A.E.F.

(463b) Boecker & Erhardt have carried out a series of experiments to determine whether natural infections of mice with *Syphacia obvelata* and *Aspiculuris tetraptera* can be used in the search for, and in the testing of, remedies against *Enterobius*. The anthelmintics used were: piperazine hydrate, crystal violet, phenothiazine, Egressin, hexylresorcinol, tetrachlorethylene and santonin. Efficacy was judged by worm expulsion and by cure of infection and varying results were obtained against the two species. The authors conclude that oxyurid infections in mice are not suitable for testing anthelmintics against *Enterobius* although they could help to a limited extent in the finding of new drugs. *Passalurus ambiguus* in rabbits remains the most suitable infection for experimental use. A.E.F.

(463c) Germer records from a German Red Cross Hospital in Korea five cases of paragonimiasis in refugees where worms or ova were present in the meninges, brain, pleura, testicle and subcuticular tissue respectively. He discusses the differential diagnosis and pathogenesis of these infections. A.E.F.

(463d) Kuhlow has studied experimentally the susceptibility of certain fishes to infection with *Diphyllobothrium latum*. Procercoids fed to *Acerina cernua* and *Esox lucius* developed to plerocercoids. Plerocercoids given by mouth to *A. cernua*, *Perca fluviatilis*, *E. lucius*, *Leuciscus rutilis* and *Trutta shasta* all established themselves: the first two, known only as intermediaries, can thus act as transport hosts as well. A 3½-month-old plerocercoid from *P. fluviatilis* fed to the author produced a mature adult and a 2-month-old specimen developed to the adult stage in a dog. Further experiments designed to test the role of the dog as a definitive host for *D. latum* showed that it is not so suitable a host as man but is none the less of importance in the dissemination of infection. A.E.F.

(463e) Gönnert continues his studies on schistosomiasis mansoni in mice with an account of the effect of miracil-D on the parasite. Changes vary according to intensity of treatment and are especially noticeable in the gonads and in egg structure. The stages of decomposition of *S. mansoni* after death in the liver are described. Parasites not killed regenerate even after serious injury: males quickly recover their normal appearance but females continue to look immature for some months. The distribution of schistosome pigment in the liver of mice also changes after miracil treatment: these changes depend on the length of infection and the time which has elapsed since treatment. A.E.F.

(463f) Gönnert describes in great detail the pathology of schistosomiasis mansoni in mice, both in normal untreated infections and after successful treatment. Histological studies revealed permanent damage, or only very slowly reversible changes, in the connective tissue: there was also serious damage to the liver parenchyma. When infection has been cured extensive regeneration occurs in the liver, with regression of granulomata and normal structure is restored. A.E.F.

464—Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Abteilung 1. Originale.

a. RICHELS, I., 1955.—"Histologische Studien zu den Problemen der Zellkonstanz: Untersuchungen zur mikroskopischen Anatomie im Lebenszyklus von *Trichinella spiralis*." **163** (1), 46–84.

b. KREIS, H. A., 1955.—"Beiträge zur Kenntnis parasitischer Nematoden XVII. Ein neuer Nematode aus dem Amazonenpapagei: *Ascaridia ornata* (Ascaroidea Railliet & Henry, 1915; Ascaridae Baird, 1853; Ascaridiinae Travassos, 1919)." **163** (7/8), 556–559.

(464a) Richels' detailed study of the microscopical anatomy and life-cycle of *Trichinella spiralis* forms part of a study of cell constancy being carried out at Bonn University. Larvae

grow slowly during the first few days after hatching but the rate increases when they reach the muscle fibres. Twenty-five days after infection growth stops until the larva enters a new host. The ratio of anterior end to total body length changes with growth from 1:4·4 to 1:96·5. The cuticle has three layers and is thickest in encapsulated larvae. Iodine-silver impregnation shows annular or rib-like structures which do not increase in number as larvae grow: the average number is 96 and they are real morphological structures but they disappear when larvae have been in the host's intestine for a few hours. An ecdysis occurs 16 to 54 hours after infection. In "muscle" larvae all the hypodermal nuclei (some 1,000) are in the lateral fields, and there are two excretory glands 85 μ from the anterior end. In the anterior end are six ganglia whose nerve nuclei are 1·5 μ in size. Each of the four muscle fields has four to five rows of elongated cells: in the larvae each cell has two fibrillae, while adult worms have a maximum of five. The cells of the cell body derive from the wall of the oesophagus: they are at first in three rows but later they enlarge and form a single row: the final number of cells, which is attained as early as the "muscle" stage, varies greatly in individual larvae. Sexual differentiation is possible in "muscle" larvae: the endgut of the male has twice as many cells as that of the female and is correspondingly longer. A.E.F.

(464b) Kreis describes and figures *Ascaridia ornata* n.sp. from the duodenum of a specimen of the parrot, *Amazona amazonica*. The new species is distinguished from *A. hermaphrodita* (the only other species of *Ascaridia* previously recorded from the Psittacinae) by the structure of the cuticle, the number of anal papillae (nine pairs in the new species, 13 in *A. hermaphrodita*), the structure of the spicules, and the form of the lips. A.E.F.

465—Zoologische Jahrbücher. Abteilung für Systematik, Ökologie und Geographie der Tiere.

a. WEINGÄRTNER, I., 1955.—" Versuch einer Neuordnung der Gattung *Diplogaster* Schulze 1857 (Nematoda)." **83** (3/4), 248–317.

(465a) In this detailed study of the genus *Diplogaster* special attention is given to the structure of the head and mouth. The genus is divided into nine "form groups" based on differences in the mouth structure, in the number and position of the bursal papillae and in the form of the oesophagus. The groups are placed in six subgenera: *Diplogaster*, *Diplogastrellus*, *Paroigolaimella*, *Pristionchus*, *Eudiplogaster* and *Mikoletzkya*. The last replaces Mikoletzky's *Fuchsia* which is preoccupied. The subgenera fall into a series starting with *Diplogaster*, which has an elongated, narrow mouth with clearly separated elements, to forms with a telescoped mouth and a short stout oesophagus. A diagnosis is given for each subgenus and a number of the species are described. There is a short discussion on Paramonov's work on the genus [for abstract see Helm. Abs., **21**, No. 961bi] and keys to the subgenera and species. Eight new species are described: *Diplogaster* (*Diplogaster*) *dendrophilus* n.sp., *D.* (*Paroigolaimella*) *microcercus* n.sp., *D.* (*Eudiplogaster*) *levidentus* n.sp., *D. paesleri* n.sp., *D. histophorus* n.sp., *D. leptospiculum* n.sp., *D.* (*E.*) *pylophilus* n.sp. and *D.* (*E.*) *elegans* n.sp. M.T.F.

466—Zoologischer Anzeiger.

a. ALLGÉN, C. A., 1955.—" Die Suctorien der schwedischen Südpolar-Expedition (1901–1903)." **154** (1/2), 36–48.
b. OSCHE, G., 1955.—" Der dreihöckerige Sehwanz, ein ursprüngliches Merkmal im Bauplan der Nematoden." **154** (5/6), 136–148.
c. RÜHM, W., 1955.—" *Sychnotylenchus abietis* n.sp., eine als Kommensale mit *Cryphalus abietis* Ratz. (Scolytidae) zusammenlebende Nematodenart." **154** (7/8), 176–182.
d. ANANTARAMAN, M. & CHANDRASEKHARAN NAIR, K. P., 1955.—" *Tetrameres* infection of fowls in India." **154** (7/8), 182–193.
e. MEYL, A. H., 1955.—" Nematoden aus einer Salzwiese bei Artern." **154** (9/10), 233–240.
f. PAESLER, F., 1955.—" *Tylolaimophorus rotundicauda* n.sp. Beschreibung einer in Massen auftretenden *Tylolaimophorus*art im Saftfluss von *Juglans regia* samt einigen Bemerkungen über die Nematodensukzession." **154** (9/10), 241–244.
g. FRÖMMING, E., 1955.—" Die ökologischen Beziehungen zwischen unseren Landlungenschnecken und den Würmern." **154** (9/10), 253–259.

h. HIRSCHMANN, H., 1955.—" *Tylenchorhynchus gracilis* (de Man, 1880) Filipjev, 1936—*Radopholus gracilis* (de Man, 1880) n.c. und seine Synonyme." **154** (11/12), 288–301.
i. RÜHM, W., 1955.—" Über einige an holzbrütende Ipiden gebundene Nematodenarten." **155** (3/4), 70–83.
j. KÄMPFE, L., 1955.—" Missbildungen und Veränderungen an Larven von *Heterodera schachtii* Schmidt und *H. rostochiensis* Wollenweber (Nematodes)." **155** (3/4), 91–100.

(466a) Allgén describes several species of Suctoria associated with marine nematodes (*Desmodora* spp.) collected over 50 years ago during the Swedish South Polar Expedition. J.B.G.

(466b) In studying morphological variations in two races of *Rhabditis papillosa*, Osche noted the occurrence of three protuberances on the tail in the dorsal and subventral positions. Their constancy of position and structure attracted his attention and he searched the literature for reports of similar structures. These were not uncommon and were mostly in female and parasitic nematodes. Osche postulates that these three protuberances represent the original places of opening of the three caudal glands and cites the observation made by Gerlach [for abstract see Helm. Abs., **19**, No. 645a] that in *Diplopeltis incisus* the three tail glands open separately. He suggests that the three glandular openings correspond to the three protuberances in a similar way to those found in the caudal appendages of rotifers. With the development of the tail the gland pores united in a common pore which became located on the tail and left the protuberances without pores. H.E.W.

(466c) *Sychnotylenchus abietis* n.sp. is separated from the other two species of the genus by the possession of a massive spear and a bluntly rounded tail with a small appendage, and by the greater length between the vulva and the anus. The host, *Cryphalus abietis*, is a new record for the genus; hitherto it has been recorded only in species of *Scolytus*. Rühm gives some biological notes on the species, a key to the species of the genus and distinguishes it from *Ditylenchus*. The description of the genus and other species appeared in Rühm, 1950 [Dissertation, Erlangen]. H.E.W.

(466d) Anantaraman & Chandrasekharan Nair record four instances of *Tetrameres* infection in domestic fowls in Madras State. They describe the morphology of the worms in detail and compare the measurements with those of *T. fissispina* and *T. mohtedai*. Their material is tentatively identified as the latter species and they are of the opinion that the infection is probably far more wide-spread in India than is recognized. S.W.

(466e) Meyl investigated the nematode fauna of a salt-meadow near Artern. In the humus under *Salicornia herbacea* and *Artemisia maritima* (soil containing 27·5 parts per thousand of salt) he found 531 adult nematodes in 20 gm.: 83·5% of these he classifies as brackish-water types and 16·5% as salt resistant fresh-water species. In a second sample, taken a short distance from the first and where the salt content was 13·4 parts per 1,000 and *Festuca distans* was growing, 20 gm. of soil yielded 959 adult nematodes divisible as: 40% brackish-water types, 59% salt resistant fresh water and 1% accidental intruders (Zufallsgast). Meyl also deals with the autecology and systematics of the various species. J.B.G.

(466f) Paesler took collections on three occasions from a slime-flux on a walnut tree and found a succession of nematodes. On 8th March 1954 he found many male and female *Ditylenchus intermedius*, many *Rhabditis* larvae and a single female of *R. debilicauda*; on 15th April 1954 masses of male and female *R. spiculigera* and single male and female *D. striatus*; on 20th July 1954 only single male and female *R. spiculigera*, single male and female *Diplogaster striatus*, numerous *D. coronata*, masses of female and a single male of *Tylolaimophorus rotundicauda* n.sp. *T. rotundicauda* differs from the only other species *T. typicus* in being half the length, in the enlargement of the posterior end of the oesophagus as a pseudo-bulb (Scheinbulbus) and in the lack of a pre-rectum extending into the tail. The male of the genus is described for the first time; there were only two in thousands of specimens of this species. The male has no bursa and a single pre-anal papilla. Both male and female are figured. J.B.G.

(466g) In the course of his review of the literature on oecological relationships in Germany between pulmonate snails and Vermes, Frömming mentions the following points of helminthological interest: (i) snails as trematode intermediaries (with a list of the most important German hosts for *Dicrocoelium dendriticum*); (ii) the possibility of snails transporting cestode ova; (iii) nematode parasites of snails; and (iv) snails transporting nematode ova and adults. Frömming also records the fact that the horse-leech (*Haemopis sanguisuga*) feeds readily on snails. A.E.F.

(466h) The information given in this paper is substantially the same as that which the author published in *Proc. helminth. Soc. Wash.*, 1955, **22**, 57–63 [for abstract see Helm. Abs., **24**, No. 143a] except that Hirschmann now takes the synonymy a stage further and brings *Radopholus oryzae* (Breda de Haan, 1902) Thorne, 1949 within the species *R. gracilis*. J.B.G.

(466i) Rühm discusses the characteristics of the nematode fauna associated with wood-boring bark beetles, and describes two new species. *Aphelenchoides martinii* n.sp. is associated with *Anisandrus dispar*. The oesophagus is aphelenchoid but the glands are weakly developed; the stylet is slender and lacks basal knobs. The ovary is outstretched with the vulva at 83%–84% and a post-vulval sac reaching over half-way to the anus. The tail is bluntly rounded and bears a sharp spike. The male gonad is also outstretched, the short tail has the usual three pairs of papillae and bears a spike. The spicules are slender with a ventral velum. This species is said to be nearest to *A. hodsoni* [= *A. subtenuis* (Cobb, 1926) Goodey, 1933] and differs from other forms associated with bark beetles in the more posterior position of the vulva. The dauerlarvae are found under the elytra and between the folds along the back in both male and female beetles; the author found them on 33·58% of the beetles examined, the average number being 81 per beetle. *Anguillonema rhizomorphoides* n.sp. is associated with *Xyleborus dryographus*. Second-stage larvae are found in the body-cavity and the free-living adults and larvae occupy the fungus-lined galleries around the bettle larvae. The stylet is short and stout with well developed basal knobs. In the female there is a post-vulval sac and the body narrows very little between vulva and anus. The tail is short and rounded with a terminal papilla. The male tail is also short and bears a transparent bursa which surrounds the tip. The author gives a detailed diagnosis of the genus and measurements of the new species. He briefly describes the type genus, *A. xylebori*, and points out that it differs from *A. rhizomorphoides* in that the female has a more slender tail with a rounded end. M.T.F.

(466j) Kämpfe describes and figures abnormalities which he found in second-stage *Heterodera* larvae, two in *H. rostochiensis* and five in *H. schachtii*. In all cases the mouth spear was malformed and often it would have been impossible for the larva to survive. Since these larvae are easy to obtain in large numbers he considers them useful subjects for the study of abnormalities. M.T.F.

NON-PERIODICAL LITERATURE

467—DELYAMURE, S. L., 1955.—[The helminth fauna of marine mammals in the light of their oecology and phylogeny.] Moscow: Izdatelstvo Akademii Nauk SSSR., 517 pp. [In Russian.]

This book deals with the helminth fauna of Pinnipedia and Cetacea and is based on material collected from eighteen host species mainly in Russia. In the first section, Delyamure describes and figures 48 species which include the following new forms: *Tetrabothrius arsenyevi* n.sp. from *Balaenoptera borealis* in the Antarctic is distinguished from *T. affinis*, *T. forsteri*, *T. ruudi* and *T. curilensis* by the body measurements. The strobila is 28·2–39·2 mm. long, the scolex is 1·4–2·09 × 2·379–2·652 mm., the bursa is 0·096 × 0·138 mm. and the bilobed ovary is 1·225 mm. long (in section). There are 33 testes and an unarmed cirrus.

Diphyllobothrium ventropapillatum n.sp. from *Hydrurga leptonyx*, in the Moscow Zoo, was undoubtedly acquired by the host in the Southern Hemisphere. It differs from other southern species by the large number of genital papillae and the absence of transverse musculature. It is further characterized by the long narrow body (52–77 mm.) composed of 87 to 123 proglottides, a long scolex (1·131–1·508 mm.), a thick-walled tubular bursa which is 0·215 mm. long, the 0·096 × 0·072 mm. sized testes and a thick-walled seminal vesicle (0·076–0·092 × 0·065–0·088 mm.). The eggs measure 0·042–0·053 × 0·038–0·049 mm. Delyamure, jointly with Krotov, describes from the Okhotsk Sea (i) *Anophryocephalus ochotensis* n.sp. from *Eumetopias jubatus* which is differentiated from *A. anophrys* by the long neck (1·5–1·7 mm.), deep suckers, the 0·065 × 0·057 mm. sized bursa and the broadened terminal end of the vagina; and (ii) *Trigonocotyle skrjabini* n.sp. from *Phoca hispida ochotensis* which is distinguished from *T. lintoni* and *T. spasskyi* mainly by the elongated narrow body (221 mm. long), a longer neck (16·5 mm.), the size of the scolex (0·716 × 0·641 mm.) and the bursa (0·096 × 0·061 mm.), and the number of testes (34 to 42). Delyamure makes *Diphyllobothrium krotovi* n.sp. for *Bothriocephalus* sp. Stiles & Hassall, 1899 from *Callorhinus ursinus curilensis* and *C. ursinus alascanus*; and *Fasciola skrjabini* n.sp. for *F. hepatica* Stiles & Hassall, 1894 nec *F. hepatica* L., 1758 from *Orca orca* and *Balaenoptera acutorostrata*. The second section of the book deals with the helminth fauna of the various host families and its zoogeography. There are original keys to most of the helminth groups, a list of species under their hosts and lists of species found in the Pinnipedia and Cetacea in Russia. G.I.P.

468—DOGEL, V. A. & BAUER, O. N., 1955.—[The control of parasitic diseases in fresh-water fish farming.] Moscow & Leningrad: Izdatelstvo Akademii Nauk SSSR., 87 pp. [In Russian.]

In this popular booklet on the control of parasitic diseases in fresh-water fish farming, Dogel & Bauer include a number of helminths. For controlling *Dactylogyrus vastator*, *D. solidus* and *D. anchoratus* they recommend immersing infected young fish (5–7 cm. long) in a 5% solution of a mixture of 1·5 Epsom salt to 3·5 kitchen salt for five to eight minutes according to temperature, but this mixture is not very effective against *D. solidus*. *Gyrodactylus elegans* and *G. medius* are both parasitic on carp and against them they recommend a bath of a 5% solution of kitchen salt for five minutes. Against *Piscicola geometra* they advise a bath in 0·2% solution of lysol for 5–15 seconds or 0·1%–0·2% solution of quicklime for 5–10 seconds, or, recently, a bath of 0·005% cupric chloride for 15 minutes has been recommended. Among the digenetic flukes they list *Sanguinicola intermedia* and *S. armata* in tench and *Carassius*, and *S. inermis* in carp. To prevent infestation they recommend the destruction of the snail intermediate hosts. The larval stage of *Neascus cuticola* (the adults occur in the heron) is found in the subcutaneous tissue of cyprinoid fishes. To prevent infection with this fluke they recommend the destruction of herons and their nests and also the destruction of snails (intermediate hosts). *Diplostomulum spathaceum* was found in the eyes of fresh-water fish and the only control measure is the destruction of gulls and their nests. Among the tapeworms they list *Caryophyllaeus fimbriceps* in carp; the only method of controlling this infection is to prevent the fish feeding on oligochaetes and to disinfect the ponds with quicklime. *Cyathocephalus truncatus* occurs in trout. To reduce the infestation the authors recommend the destruction of pike, perch and other fish which are responsible for the dissemination of this parasite. *Triaenophorus nodulosus* is pathogenic in trout and to prevent infection they recommend destroying pike which spread the parasites. *Echinorhynchus truttae* also occurs in trout but no recommendations for treatment or prevention are given. C.R.

469—DUBININA, M. N., 1955.—[Parasitological investigations of birds.] Moscow: Izdatelstvo Akademii Nauk SSSR., 134 pp. [In Russian.]

Dubinina describes her method of making a comprehensive parasitological investigation of birds starting from the collection of the birds and their external parasites to the examination of all organs for internal parasites. G.I.P.

470—FAUST, E. C., 1955.—"Animal agents and vectors of human disease." London: Henry Kimpton, 660 pp.

471—GOREGLYAD, K. S., 1955.—[Diseases and pests of fish.] Moscow: Gosudarstvennoe Izdatelstvo Selskokhozyaistvennoi Literaturi, 285 pp. [In Russian.]

This general account of various diseases and pests of fish deals shortly also with common helminth and leech species. G.I.P.

472—KIRYANOVA, E. S., 1955.—[Nematode parasites of plants.] Moscow & Leningrad: Izdatelstvo Akademii Nauk SSSR., 156 pp. [In Russian.]

Kiryanova gives the basic characters of plant-parasitic nematodes and discusses species harmful to agricultural crops and flower-growing and their control. The systematic section is in the form of a key to genera of plant and soil nematodes. The booklet is illustrated by 113 drawings. G.I.P.

473—RIZHIKOV, K. M., 1955.—[Helminths of domestic aquatic birds.] Moscow: Izdatelstvo Akademii Nauk SSSR., 111 pp. [In Russian.]

This popular booklet describes the most common and pathogenic helminths of geese and ducks. There are 46 illustrations. G.I.P.

474—SHIKHOBALOVA, N. P., 1955.—[Helminthiases common to man and animals.] Moscow: Izdatelstvo Akademii Nauk SSSR., 87 pp. [In Russian.]

475—SOIL ZOOLOGY. PROCEEDINGS OF THE UNIVERSITY OF NOTTINGHAM SECOND EASTER SCHOOL IN AGRICULTURAL SCIENCE, 1955, edited by D. K. McE. Kevan. London: Butterworths Scientific Publications, xiv + 512 pp.

a. PETERS, B. G., 1955.—"Soil-inhabiting nematodes." pp. 44–53. [Discussion pp. 53–54.]
b. BROWN, E. B., 1955.—"Some current British soil pest problems." pp. 256–267. [Discussion p. 268.]
c. COOPER, B. A., 1955.—"A preliminary key to British species of *Heterodera* for use in soil examination." pp. 269–280.
d. DUDDINGTON, C. L., 1955.—"Inter-relations between soil microflora and soil nematodes." pp. 284–299. [Discussion pp. 299–301.]
e. PETERS, B. G., 1955.—"A note on simple methods of recovering nematodes from soil." pp. 373–374.
f. WILLIAMS, T. D. & WINSLOW, R. D., 1955.—"A synopsis of some laboratory techniques used in the quantitative recovery of cyst-forming and other nematodes from soil." pp. 375–384.
g. COOPER, B. A., 1955.—"A mechanical device for concentrating *Heterodera* cysts (Nematoda)." pp. 385–389.
h. JONES, F. G. W., 1955.—"A microplot technique for the study of soil populations of cyst-forming root eelworms of the genus *Heterodera*." pp. 390–393. [Discussion pp. 401–402.]
i. JONES, F. G. W., 1955.—"Quantitative methods for the estimation of cyst-forming nematodes (*Heterodera* spp.) in soil." pp. 394–401. [Discussion pp. 401–402.]
j. PETERS, B. G., 1955.—"A note on handling and processing nematodes." pp. 417–418.
k. COOPER, B. A., 1955.—"Mounting technique for identification of *Heterodera* eelworm cysts." pp. 419–420.

(475a) Nematodes, of which about 10,000 species have been described, occur wherever there is sufficient moisture, being very numerous in the top few inches of soil, particularly in the vicinity of plant roots. Peters describes their biology, morphology and classification very briefly and suggests that the beginner should start by learning to recognize the twelve genera most commonly found in soil. M.T.F.

(475b) Among other pests brief mention is made of three eelworms. *Heterodera rostochiensis* is the most important eelworm pest in Great Britain. A sampling service advises

farmers on the safety of growing potatoes. On a heavy soil potatoes can be grown more frequently than on light soil. *H. göttingiana* occasionally causes pea failures. *Vicia faba* is a host which shows little or no damage by this eelworm. *Meloidogyne hapla* has caused severe damage to *Scabiosa caucasica* and the failure of mangolds, sugar-beet, kale and carrots on light sandy soil on the Norfolk-Suffolk border. J.B.G.

(475c) The need for a simple means of identifying cysts of *Heterodera* spp. and the previous work in this field introduce a detailed description of cyst morphology, with the associated terminology. The key which follows makes possible the identification of most cysts of *Heterodera* spp. which may be found in the British Isles. J.J.H.

(475d) Three groups of fungi prey on nematodes: the Zoopagales, the nematode-trapping Hyphomycetes and the endozoic Hyphomycetes. Recent studies show that they are well represented in the soil and that they may have an effect on the nematode fauna. Experimental work using the fungi for biological control of nematodes is in its early stages. J.B.G.

(475e) If soil is well mixed with water, nematodes may be recovered either in the supernatant liquid or the sediment, according to the time between stirring and pouring off the water. Nematodes may also be extracted by passing through sieves with meshes ranging from 25 to 400 per inch. The Baermann funnel may also be used. M.T.F.

(475f) Cyst-forming nematodes may be extracted from soil by flotation in a flask or in a Fenwick can. The cyst contents may be estimated after their release by a dilution technique and counted in a form of Fenwick slide. Nematodes in aqueous suspension are counted in a Peters counting slide. The collection and use of root diffusate to estimate hatchability of *Heterodera* spp. is described. Non-cystic forms of eelworms can be collected in Oostenbrink's apparatus, and eelworm infestation of stained roots may be estimated by the use of a high speed homogenizer. J.J.H.

(475g) A modified Syntron F.01 Feeder is used to concentrate *Heterodera* cysts. The principle of the machine is described, and a diagram clearly shows the modifications. Cysts must be clean; with *H. rostochiensis* a separation of 95% may be possible. The machine can be used to concentrate cysts in soil and to extract clover seed. J.J.H.

(475h) In order to overcome the disadvantages of field plots and of plant pots, microplots, made from concrete paving stones and open to the subsoil below, have been used in the study of *Heterodera* populations. Each plot holds half a ton of soil and is equivalent to 1/6,000 of an acre. The soil with the required infestation is well mixed, subsoil and topsoil being reconstituted separately, and placed in the microplots. Examples are given of changes in *Heterodera* populations under host and non-host crops. M.T.F.

(475i) For estimating *Heterodera* populations in soil the cysts are floated from soil samples. Jones considers the errors involved and concludes that the size of sample should be such as to contain 100 or more cysts. There is little information on the size, depth or number of samples which should be taken in the field to give the most reliable information about the population. Various methods which have been suggested for the assay of the contents of cysts are outlined. M.T.F.

(475j) Brief mention is made of methods for handling, anaesthetising, relaxing and fixing, mounting and counting nematodes. Some sources supplying apparatus are also mentioned. J.B.G.

(475k) Soaked cysts of *Heterodera* spp. are bisected, the vulval cone is cleaned, bleached, passed through alcohol to clove oil and mounted in Canada balsam. J.J.H.

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